

***Neeraj Sharma's-***

***NOTES FOR UROLOGY PRACTICALS***

## ***Preface***

### **Knowledge shared is the knowledge gained**

The idea of writing these notes for urology practical exams occurred to me when I was preparing for my practical exams .I constantly felt the need of a book that should be dedicated to prepare the student for urological practical examinations.

Although the efforts by USI-BOE are phenomenally great and unmatched in importance but most of us usually forget the questions asked and topic discussed as soon as the class is over.

These notes are just a compilation of those questions asked and subject topic discussed in various USI-BOE mock exams, CMEs and various practical case discussion classes conducted at various places during the period 2011-13.

These notes do not claim originality of questions or answers, these are merely a compilation of various questions asked, their answers searched and then arranged topic wise.

I heartily thank all my teachers who selflessly taught urology as a subject and are still teaching .this book is a mark of respect towards their teaching.

I thank all my colleagues who shared their knowledge, question banks, presentations and notes.

I thank all my editors and distributors for making this project a reality.

I heartily thank my family for shelling out their part of time with me in writing these notes.

As my teachers have never charged a single penny for sharing their knowledge, these notes are provided to you **free of cost**.

I will consider the project a real success if you guys find it useful for your exams .I request all of you to add as many as question answers in each topic of these notes and pass it on to your successive urology generations.

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## **Neeraj Sharma's ...Notes For Urology Practicals**

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**NOTES FOR UROLOGY PRACTICALS**

*Carcinoma penis*

Case ... 50 yr/ male/ 2 cm growth over glans penis

- Ulcero proliferative growth
- Duration 4 months
- Painless
- Discharge + , no blood flow
- Uncircumcised
- Left side 3 cm mobile ing. L.N.

**Q: what is the presentation age of Ca penis?**

A: 50-60 y, 6<sup>th</sup> decade

**Q: What is etiology of Ca Penis?**

A:

1. Chronic irritative effects of smegma
2. Improper Hygiene
3. Phimosis
4. HPV inf<sup>n</sup> (HPV-16)
5. Tobacco Products → smoking is a leading risk factor
6. Penile trauma / tear
7. BXO
8. multiple number of sexual partners
9. Treatment with PUVA / phototherapy ← Psoralen ultra violet

**Q: what is the role of neonatal circumcision?**

A: protective (only if done in neo-natal period) , reduces the risk 5 times

DOES NOT protect against CIS

**Q: How much risk is reduced by neonatal circumcision?**

A: 5 times

**Q: how do smegma / improper hygiene cause cancer?**

A: Desquamated epithelial cells (smegma) when acted upon by Bacterial action produce carcinogenic by-products, which lead to cancer.

**Q: what populations practice neonatal circumcision?**

B: Jews & Muslims

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**Q: does neonatal circumcision provides protection against CIS?**

A: no

**Q: what are the other advantages of circumcision?**

A: reduces the chances / risk of STDs

**Q: what is the counterpart malignancy in female due to HPV inf<sup>n</sup>?**

A: Ca Cervix

**Q: how does HPV-16 causes Ca-Penis?**

A: HPV 16 → Oncoprotein E6 → Binds to P<sub>53</sub>

→ Oncoprotein E7 → Binds to Rb Gene

} leads to cell-cycle-Dys regulation

**Q: What will you ask is history?**

A:

- H/O multiple sexual partners
- H/O partner having Cervicitis
- H/O Barefoot walking → ing L.N.
- H/O phimosis, circumcision
- H/O local application of any medicine, oil.

**Q: what will you see in local Exam<sup>n</sup>?**

A:

- Size of glans, BXO changes , penile shaft, , Prepuce, corona sulcus, Testis
- Ulcer-size, site-shape, base, floor, edges ,discharge
- Ing LN s

**Q: what is the incidence of Ca in BXO pt?**

A: 5-10 %

**Q: How can you prevent Ca-Penis?**

A:

- Routine neonatal circumcision
- Good Hygiene
- Avoid HPV
- Condom
- Avoid Tobacco
- HPV vaccine

**Q: what is Gardasil / cervarix?**

A: HPV vaccines

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- 1<sup>st</sup> dose = @ puberty = 13 yrs
- Booster = @ marriage = 26 yrs

### **Q: how can Ca-Penis Present?**

A: Exophytic / ulcerative / ulcero proliferative

### **Q: what are the exophytic lesions of penis?**

A:

1. Condyloma acuminata
2. Bushike lowenstein tumour
3. Keratotic Balanitis
4. Pseudo epithelial micacious
5. Ca-penis

### **Q: what are ulceroproliferative lesions of penis?**

A: all above

### **Q: D/d of genital ulcers?**

A:

- chancre- syphilis –T- palladium
- Chancroid – H.Ducreyi
- LGV - Chlamydia
- Herpes – HSV-II
- TB- TB

### **Q: which has poor prognosis- ulceration or proliferative growth?**

A: ulcerative, : because more chances of mets

### **Q: what is the most imp Barrier to invasion?**

A: Bucks fascia

Deep dorsal nerve / artery runs deep to bucks fascia

### **Q: what are layers of Penis?**

A: Skin, Dartos, Bucks, Albuginea, corpora

### **Q: what is the most imp prognostic factor?**

A: LV Invasion, Grade of tumour

### **Q: What is the mode of spread & sites?**

A: the mode of spread -Lymphatic

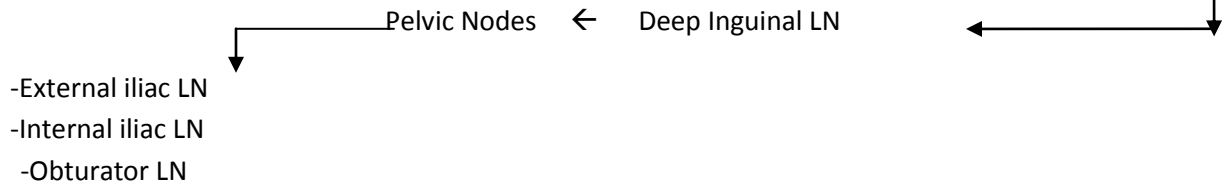
Sites -To femoral & iliac nodes

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**Q: what is the Lymphatic drainage of penis?**

A: Prepuce skin + shaft skin → superficial ing L.N.

Glans → Corporal Bodies → lymphatic collar at the Base of penis → superficial ing L.N.



**Q: can there be skip lesion (L.N.)?**

A: No

**Q: is the drainage unilateral or bilateral?**

A: Bilateral – drainage at inguinal areas

**Q: what is the cause of death in Ca penis?**

A:

1. Cachexia
2. Sepsis
3. Chr. Inf<sup>n</sup>
4. Femoral vessel erosion

**Q: What are the distant mets sites?**

A:

- lung,
  - liver,
  - Bone,
  - Brain
- } involvement is very rare 1-10%

**Q: Can distant mets occur in the absence of LN involvement?**

A: NO

**Q: what is the prognosis if patient is not treated?**

A: death within 2 yr

**Q: what % of pts have S.C.C?**

A: 95% of penile malignancies are S.C.C

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**Q: Can ca penis spontaneous remit?**

A: No

**Q: what are the common growth patterns?**

A: Papule → Warty growth → nodules → Exophytic growth

Or

Flat desquamation + Ulcer → deep excavated

**Q: where can there be skip L.N involvement i.e. pelvic L.N. involved & inguinal L.N not involved)?**

A: Usually rare, in cases of involvement of corpora cavernosa & urethra, there can be skip lesions

**Q: what are the pre malignant cond<sup>n</sup>?**

- A. Keratotic Balanitis
- B. BXO
- C. Cutaneous Horn
- D. Pseudo epitheliomatous keratitis
- E. Leukoplakia

**Q: what is the distribution of ca – penis?**

A:

- Glans 48%
- Prepuce 21%
- Coronal sulcus 16%
- Shaft 2%

**Q: what are 'B' symptoms in ca penis?**

A: weakness fatigue, malaise

**Q: will you DRE in a pt of Ca penis?**

A: yes,

- State of perineal body
- Prostate assessment (old age pt)

**Q: how will you clinical assess pelvic L.N?**

A To see for pelvic lymph nodes –internal Iliac and Obturator do bimanual exam<sup>n</sup> (same as for TURBT)

**Q: What will you do next?**

A;

- Basic routine Blood & urine Ix

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- Coagulation Profile (do only if there is any bleeding tendency /history.
- Fl/by edge-**wedge** biopsy

### **Q: What will you see in Biopsy report?**

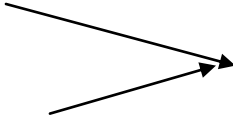
A: Grade of tumour, LVI, Depth of invasion, type of Ca

### **Q: what If biopsy is negative?**

A: repeat biopsy with multiple sites wedge biopsy

### **Q: what is Cubilla classification?**

A: Classification of Histological types as

- 1- Usual type → 60% → Superficial spreading
  - 2- Papillary - 15%
  - 3- Basaloid - 10%
  - 4- Warty – 10%
  - 5- Verrucus – 10%
  - 6- Sarcomatous- 03%
- 
- Aggressive

### **Q: what is the imp of depth of invasion?**

A: more depth of invasion → more chances of nodal mets.

### **Q: What is Broders grading/ classification?**

A: Histological grading system based on differentiation

- Grade 1: low grade – well differentiated
- Grade 2: intermediate
- Grade 3: High grade → poorly differentiated

### **Q: what are the most important factors in Biopsy report?**

A:

- LVI
- Grade of the tumour

### **Q: What do you expect on lab Investigations?**

A:

- Anemia
- Leucocytosis
- Hypoalbuminea
- Dearranged RFTS → Ureteric Obstn
- Hypercalcemia → part of para-neoplastic syndrome
- Increase PTH → para-neoplastic syndrome

### **Q:What does Hypercalcemia depict?**

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A: Bulky disease, / mets, / micromets

After cure hypercalcemia should come to normal

**Q: What are the types of bone mets?**

A: Ca penis – osteoclastic

Ca prostate – Osteoblastic = sclerotic

**Q: How will you treat hypercalcemia?**

A: Hydration, diuretics, Bis-phosphonates

1. PTH → increases sr.  $\text{Ca}^{++}$
2. Calcitonin → decreases sr.  $\text{Ca}^{++}$

**Q: what will you as next Investigation?**

A: USG penis (penile USG -7.5 MHz)

- For corpora cavernosal invasion

**Q: what is the USG appearance of Ca penis?**

A: Hypo-echoic

**Q: What all urological malignancies can produce hypercalcemia?**

A: RCC, Ca penis, TCC (virtually all malignancies can cause increase  $\text{Ca}^{++}$  due to PTH-RH Release)

**Q: What are the dyes for DSLNB (Hornblase)?**

A: Isosulphan Blue,  $^{99}\text{Tc}$  nano colloid sulphur

**Q: what are the ind<sup>n</sup> for USG / MRI penis?**

A:

- High suspicion of cavernosal involvement
- Thinking of penis sparing Sx
- Equivocal physical findings

**Q: what will you do if inguinal L.N. are palpable?**

A: CECT abd +penis if inguinal L.N are palpable, to assess pelvic LN.

**Q: What is the role of FDG-PET?**

A:

- Can pick up inguinal mets its but role is not established.
- Doubtful mass on CECT
- In cases of Hypercalcemia with few L.N. (where hidden mets disease is suspected to be cause of increase  $\text{Ca}^{++}$ )



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What are distant mets sites?**

A: Lung, Bone, Liver.

**Q: What is Jackson Staging?**

A:

- 1- Only glans & prepuce involvement
- 2- Growth on shaft
- 3- Mobile L.N
- 4- Fixed L.N.

**Q: where will you look for nodes in CECT?**

A: Anterior to femoral vessels (just below skin)

L.N will enhance in CECT

**Q: What are stages of Ca penis?**

Cis	Stage 0	Tis	Carcinoma in situ
		Ta	Verrucous Ca
Glans and prepuce	Stage I	T1a	Subepithelial with no LVI
Shaft	Stage II	T1b	Sub epithelial with LVI
		T2	Corpora involvement
		T3	Urethral involvement
		T 4	Adjacent organ involvement
Mobile nodes	Stage III		
	IIIa	N1	Single mobile L.N.
	IIIb	N2	Multiple unilateral mobile / Bilateral mobile
Fixed nodes	Stage IV	N3	Fixed
		M1	Distant mets

**Q: What is this staging / classification for ca penis?**

A: AJCC → Roughly similar to Jackson's staging

**Q: What are the major D/Ds?**

A;

- Condyloma acuminatum (viral infn by HPV)
    - Ulcero proliferative
    - -Ix-Biopsy
    - -Mx –Podophyllin, - Imiquimode
  - Buschke Lowenstein Tumour (Verrucous carcinoma)
    - also known as Giant Condyloma
    - Cause HPV
    - Mx – excise
  - BXO
    - – caused by – Borrelia burgdorferi (spirochete)
    - Autoimmune
    - Idiopathic
  - Chancre
    - (T.Pallidum) – Syphilis – primary
    - Ix-VDRL, biopsy, Dark field Exam<sup>n</sup>
    - Mx – Penicillin, Doxy
  - Chancroid (d)
    - –H.Ducreyi
    - painful with Ing L.N. (+)
    - Tender L.N
    - Ix-culture,
    - Rx-Cipro, Erythro, azithro
  - Lympho Granuloma Inguinale → Chlamydia
  - Tuberculosis
- Verrucous Carcinoma: also known Buschke – Lowenstein Tumour
- Lower grade variant of S.C.C
  - low metastatic potential
  - Caused by HPV-6
  - Large fungating mass
  - On glans, oral, nasal mucosa
  - Mx – excision

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: How will you manage Ca penis of different stages?**

A:

- Low grade (G1,G2), Low stage (T1s, Ta, T1) = penile preserving
- T<sub>1</sub>G<sub>3</sub> / T2-T4 = penile amputation – partial / complete
- L.N. palpable: Inguino pelvic dissection
- Mets : chemo (neo- adjuvant)

### **Q: what will you do for CIS?**

A: 5 –fluorouracil

Imiquimod cream;

- immune response modification
- Put the cream in condom and wear the condom for 30 min
- Causes extreme discomfort, pain, itching, & scarring.

### **Q: What can you do for T<sub>a</sub> / T<sub>1</sub>?**

A:

- Radiation Rx
- Laser ablation : NDYAG (6mm depth, 1060 nm, 7% recurrence rate
- Mohs micrographic Sx (Mohs was general surgeon – 1938)
- (now a day's excision with frozen section has replaced Mohs S<sub>x</sub>, try to avoid saying Mohs surgery in exams as no one does it now )
- Circumcision for prepuce skin involvement

### **Q: what is the safe margin for excision?**

A:

- 5mm – low grade (I,II)
- 10 mm –high Grade ( III)

### **Q: when can you do partial penectomy?**

A: Usually for lesions of glans & corona

### **Q: How will you complete penectomy?**

A: lesions involving corpora cavernosa; urethra

Superficial lesions near the base of penis when adequate margin cannot be left behind.

### **Q: What lasers can you use?**

A: CO<sub>2</sub> – 0.1 mm depth – not sufficient

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NDYAG – 6mm      Best with concomitant negative frozen section  
KTP – 4mm

**Q: what is the advantage of laser?**

A: Cosmetic

Sexual activity – preserves Glans Sensation  
--Preserves length of penis

**Q: When will you advice penile amputation?**

(A) T<sub>1</sub> G<sub>3</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>

**Q: what are the two most imp prognostic factors?**

A: LVI, nodal involvement, grade of tumour

**Q: what is the Prognosis of Ca- Penis?**

A:

- Without LN, 5 yrs survival > 80%
- With LN 5 yr survival , with treatment = 60%-80%
- With LN 5 yr survival ,Without Rx → 0.5%

**Q: How can you predict that given palpable node is involved or not?**

A: High chances for a palpable L.N. to be positive if...

Nodal characters

- Hard, fixed , >= 3cm
- Persistent after antibiotic course

Tumour characteristics

- High grade, LVI+,
- High stage

**Q: what will you do for palpable LN?**

A: FNAC of palpable L.N. espl if grade of tumour is G1, G2, Gx (low risk) (EAU guidelines)

**Q: what % is false negative of FNAC?**

A: 20-30%

**Q: what if FNAC is negative?**

A: Excision biopsy / repeat FNAC

**Q: what will you do for high risk Ca-Penis with mobile palpable unilateral LN?**

A: if the L.N. is positive for malignancy on FNAC or the case falls in high risk group, I will do

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Ipsilateral ilio-inguinal dissection + (contralateral superficial dissection + frozen Section)

**Q: what are the disadv of inguinal dissection?**

A: Morbidity

- Pulm embolism
- Wound inf<sup>n</sup>
- Flap necrosis
- Lymphodema

**Q: How will you prevent flap necrosis?**

A:

- Thick skin flap along with fascia scarpa
- Preserve saphenous vein
- Myocutaneous flap cover
- Sartorius slide

**Q: What is Chemosurgery?**

A: Moh's micrographic sx is also known as chemosurgery

**Q: How will you do sartorius slide?**

A: Detach sartorius from ASIS and re-suture to inguinal ligament

**Q: What are the famous Indian studies w.r.t. LN involvements in ca penis?**

A: Ravi et al } depicts 5yr survival & compln of ing LN dissection  
Srinivasan et al }

**Q: what is the Risk stratification for LN involvement?**

A

Risk type	T stage	vertical growth depth	LVI	% chance for malignancy
Low risk	T <sub>1s</sub> , T <sub>a</sub>			0-5% involvement
Intermediate Risk	T <sub>1</sub> G <sub>1</sub> T <sub>1</sub> G <sub>2</sub> T <sub>1</sub> G <sub>3</sub>	depth < 4 mm	No-LVI	20-30-% involvement
High Risk	T <sub>1</sub> T <sub>3</sub> T <sub>4</sub> Any T	or vertical growth > 5 mm	+ No LVI + LVI	Chance 60%

**Q: what are the famous prognostic factors?**

A: Ficara's prognostic factors / nomogram

- 1- LVI Invasion

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- 2- Tumour Thickness
- 3- Corpora involvement
- 4- Urethral involvement
- 5- Palpable LN
- 6- Grade of the tumour

**Q: How will you fl/up the pt on surveillance low risk pt [i.e.-- T<sub>1s</sub>, T<sub>a</sub>, T<sub>1G1</sub>]?**

A: 1<sup>st</sup>-2<sup>nd</sup> yr @ 3 mo → Phy exam<sup>n</sup> & CBC  
3<sup>rd</sup>-4<sup>th</sup> yr @ 4-6 mo → Phy exam<sup>n</sup> & CBC  
After 5<sup>th</sup> yr annually → Phy exam<sup>n</sup> & CBC

} EAU

The components of fl/up exam<sup>n</sup> are phy exam<sup>n</sup> of penis & groin & .CBC

**Q: Can you do FNAC of Non palpable LN?**

A: no ; (USG guided may be done)

**Q: when will you do FNAC?**

A:

- Palpable LN in intermediate risk or low risk
- for high risk cases straight away inguinal dissection is advisable

**Q: what is sensitivity & Specificity of FNAC**

A: Sensitivity: 80-90%

Specificity: 100%

**Q: Who described sentinel LN?**

A: Cabanas

**Q: what is Cabanas LN?**

A: Supero medial group of Daseler's

**Q: Is Dynamic Lympho-scintigraphy available in India?**

A: NO (till 2014)

**Q: How will you do Dynamic sentinel LN biopsy?**

A:

1. Tc labeled nano colloid : around the lesion (50 mBq),night before surgery
2. Iso sulphur Blue(Methylene blue): Intradermal around and into the lesion: 30min before surgery
3. Next day Surgery + Gamma camera use (crystal Cam) Hand Held
4. Sensitivity 98%, specificity 90%
5. Remember... Nano colloid -Night before surgery

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... Methylene blue—Minutes before surgery

**Q: what is superficial ing dissection?**

A: removing the inguinal nodes above Fascia lata

**Q: What is deep ing dissection?**

A: removing the inguinal nodes below fascia lata contained within femoral triangle.

**Q: What is pelvic dissection?**

A: removing the External iliac, internal iliac & Obturator group of lymph nodes.

**Q: What are the boundaries of femoral Triangle?**

A:

- Medially – adductor longus
- Laterally – sartorius
- Superiorly – inguinal Ligament

**Q: What are the contents of Femoral Triangle?**

A: F. Nerve, F. Artery, F. Vein, NAV ↔ VAN

LN → Cloquet LN → also known as “Rosenmullers LN”

The lymph node is in canal → femoral Canal

**Q: what is the name of modified inguinal dissection?**

A: Catalona op<sup>n</sup>

**Q: will you do unilateral or bilateral dissection inguinal lymphadenectomy?**

A: bilateral

**Q: when will you do unilateral ing lymphadenectomy?**

A: when unilateral single L.N. appears 6 months or after the initial penectomy.

**Q: what will you do if pt is high risk and no nodes palpable?**

A: B/L superficial inguinal dissection & frozen section

**Q: what if unilateral mobile node (high risk)?**

A: ipsilateral complete dissection (superficial and deep inguinal dissection with pelvic lymph node dissection) + contra lateral (C/L) superficial inguinal dissection.

**Q: what if B/L mobile palpable LN?**

A: Do FNAC first → +ve → then

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- Option 1...B/L ilioinguinal complete dissection+ Adj. chemo
- Option 2...Neo adj chemo + B/L ilioinguinal complete dissection

**Q: When will you give neo-adjuvant chemotherapy?**

A:

- unilateral LN +ve > 4 cm
- Bilateral LN +ve
- More than 2 LN +ve unilateral/ bilateral
- Bulky disease
- Fixed nodes
- Pelvic nodes

**Q: what will you do if nodes are fixed?**

A: give chemo cisplatin + 5 FU x 3 cycles (after penectomy & but before inguinal dissection)

↓  
Re assess

↓  
If resectable - Aggressive resection  
If non resectable- continue chemo

**Q: what are the side effects of chemo?**

A: Cisplatin

- Nephrotoxicity
- BMD bone marrow depression
- Oto-toxic
- Peripheral neuropathy

5FU

- Stomatitis, Gastritis
- Nausea, Vomiting, Diarrhea (NVD)
- Radio sensitizer

**Q: if the inguinal LN mass is not regressing after chemo; what next step will you do?**

A: Put endovascular stent in femoral artery, fl/by chemo/radio

**Q: what are the problems with frozen section?**

A:

- False negative → problem comes due to freezing of tissues in cryostat and thus cellular architecture is lost
- Operative delay
- Cost
- Not readily available



**Q: What is the cause of death in Ca – penis?**

A:

- Cachexia
- Hypercalcemia
- Femoral vessel Blow out
- Infection

**Q: what will you do if there is femoral erosion & oozing?**

A: it is usually arterial blow out and vein is usually thrombosed

- Option 1: Tie it in continuity above inguinal ligament
- Option 2. Endovascular stent fl/by chemo + radio therapy

**Q: How will then Blood circulation be maintained to lower limb?**

A: by profunda femoris artery via superior gluteal artery

**Q: what are the compl<sup>n</sup> of tying the femoral artery?**

A:

- Gluteal claudication
- L/L claudication and Ischemia

## **RADIOTHERAPY**

**Q: what is the role of radiotherapy in – primary lesion, - nodes in ca penis?**

A:

- Curative for primary lesion (penile lesion)
- No use of radiotherapy for inguinal LN
- May be used for palliation for fixed LN

**Q: How will you give XBRT?**

A: Prone position, penis hanging through a hole (in lead plate) into water bath

- 60 Gy in 30 Fractions x over 6 wks
- 70 Gy in 7 wks

**Q: How are the oncological outcomes?**

A:

- Oncological effects are inferior to surgery Sx

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- More chances of Mets as delay / slow Mx
- Cosmetic appearance is good

**Q: how else can you give radiotherapy?**

A:

- Plastic mould Block brachytherapy using Iridium 192 (m/c) or Radium 206
- Seed implant in Pre drilled template
- Dose 60 Gy over 10 days
- Faster therapy → decreases the chances of mets

**Q: what are the contra- ind<sup>n</sup> to radiotherapy for primary penile lesions?**

A:

- Tumour > 4 cm
- High grade tumour
- Involving corpora / urethra
- H/O penile / urethral reconstructive / stricture Sx

**Q: Is there any role of radiotherapy in inguinal LN?**

A: some role as palliative procedure or multimodality approach for fixed nodes

**Q: Is penile necrosis more after XBRT / Brachy radiotherapy Rx?**

A: after Brachytherapy

**Q: Is sq cell Ca, radio sensitive?**

A: no, it is radio resistant

At very high doses (60 Gy) it gets destroyed by Radio Rx.

**Q: What is peculiar dis-adv of Radio Rx?**

A:

1. Exam<sup>n</sup> of Inguinal Region becomes difficult
2. Slow treatment so more chances of mets
3. Urethra-cutaneous fistula, infertility

**Q: what chemo Rx will you give?**

A:

Option 1. 5 FU + cisplatin

Option 2. PIP / TIP –

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Paclitaxel-- 175 mg/m<sup>2</sup> on day 1</li><li>• Ifosfamide-- 1200 mg/m<sup>2</sup> on day 1,2,3</li><li>• Cisplatin-- 25 mg/m<sup>2</sup> on day 1,2,3</li></ul> | } cycles every 3 wk x 3 cycles or<br>4 cycles |
|---|---|

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the indn for laser Rx?**

A: T<sub>is</sub>, low grade T<sub>1</sub> G<sub>1</sub>, T<sub>1</sub> G<sub>2</sub>

**Q: what is the time required for Healing after laser?**

A: 12 wks

**Q: what is the safe margin for partial penectomy?**

A: older belief 2 cm (1-2cm)

Now a days 5mm for low grade cancer and 10 mm for high grade cancer is sufficient.

**Q: what is the recurrence rate after partial penectomy?**

A: Upto 8%

**Q: How many LN are there in superficial Ing region?**

A: 5-25 LN

5 groups of Dessler's LN

**Q: what are the 5 Dessler's group of LN ?**

A;

- Central group → around saphenofemoral Jn
- Supero lateral → around superficial circumflex vein
- Infero lateral → around Lat femoral cutaneous vein
- Supero medial → around Superficial epigastric
- Infero medial → around great saphenous vein

**Q: what are deep Ing LNs?**

A:

- they are deep to tensor Fascia lata
- Few in numbers 4-6
- Lie primarily medial to femoral vein
- Cloquet is the most cranial of this group

**Q: Where is Cloquet (also called Rosenmuller's LN) LN situated?**

A:

- Medial to femoral vein
- Situated B/w femoral vein & lacunar ligament

**Q: which pelvic LNs will you remove?**

A: ext. iliac, int. iliac, obturator group of LN

**Q: which is more superficial camper fascia or scarpa fascia?**

A: Camper is more cutaneous/ superficial

## **Neeraj Sharma's ...Notes For Urology Practicals**

'C' comes before 'S', Camper comes before Scarpa during dissection

**Q: where will you dissect skin flap?**

A: camper fascia contains the arborizing plexus for skin so camper fascia goes with skin & dissection goes b/w camper & scarpa.

More over lymphatics run in scarpa → so remove it along LNs during inguinal dissection.

For thick flaps → take scarpa along with skin flap so that skin thick flap is achieved.

**Q: Why horizontal /transverse skin incision is made?**

A: Blood supply in groin is medio ↔ lateral, so horizontal /transverse skin incision is made.

**Q: what is fn of femoral Nerve?**

A: Quadriceps femoris } motor supply  
Sartorius muscle }

Cutaneous anterior thigh – sensory supply

**Q: what is the floor of femoral triangle?**

A: Pectineus muscle- Medically

Iliopsoas – laterally

**Q: what is the land mark for S.F Jn?**

A: 2 finger breadth Infero-lateral to pubic tubercle.

**Q: what are the ind<sup>n</sup> sentinel lymph node Biopsy?**

A:

1. High grade ca penis with non palpable LN
2. High stage ca penis T<sub>2</sub>/ T<sub>3</sub> with non palpable LN( N<sub>0</sub>)

**Q: who describe sentinel LN?**

A: Cabanas

**Q: who described modified Ing lymphadenectomy?**

A: Catalona Op<sup>n</sup>

**Q: what are components of modified dissection or Catalona Op<sup>n</sup>?**

A:

- Shorter skin incision
- No need to go Lateral to femoral artery
- No need to go caudal to fossa ovalis
- Leave intact saph. Vein
- Elimination of need to transpose the sartorius

**Q: What are the complications of Catalona op<sup>n</sup>?**

A:

1. Seroma
2. Wound inf<sup>n</sup>
3. Skin necrosis
4. Lymphedema

**Q: How will you avoid compl<sup>n</sup> of Catalona op<sup>n</sup>?**

A:

- Create thick skin flap
- tack the flap to floor of dissection
- deploy closed suction drain
- Light pressure dressing
- Prolonged use of Antibiotics
- Leave saph. Vein intact

**Q: what are the indications for radical ilio-inguinal lymphadenectomy?**

A: ind<sup>n</sup>:-

- tumour high grade + palpable LN
- tumour any grade with FNAC +ve LN

**Q: When will you do inguinal dissection – along with penectomy or later?**

A: usually 6 wks after partial / complete penectomy

If LN dissection is done along with penectomy then penectomy in same sitting → operative site will not heal because of the backload oedema & swelling of the penis. Hence some time gap is required.

**Q: what are boundaries for radical 'ilio inguinal LN dissection'?**

A:

- Superior--line joining ASIS to pubic tubercle
- Lateral--Drop 20cm vertical from ASIS
- Medial--Drop 15 cm vertical from pubic tubercle.
- Inferior—join the lower ends of the medial and lateral lines

**Q: How will you cover femoral vessels in radical 'ilio inguinal LN dissection'?**

A: sartorius slide flap

Detach sartorius from its origin (ASIS) and transpose & fix to inguinal ligament.

**(Q) Suppose skin edges are not able to approximate then how will you close the defect in radical 'ilio inguinal LN dissection'?**

A:

- Non tension suturing
- Skinner flap –(scrotal rotation flap)
- Abd wall flap (taba-taba-ei flap)

---

**NON SQ CELL CA**

**Q: what if penile growth biopsy report comes as Basal cell Ca?**

A:

- Very rare
- Sun exposed areas
- On shaft
- Excision is complete cure
- Does not metastasize

**Q: what if penile growth biopsy report comes as melanoma?**

A:

- Rare
- Sun exposed areas
- Glans mostly

**Q: How will you stage melanoma?**

A: Clark's staging – according to depth of invasion (according to mm<sub>s</sub>)

Breslow staging – according to thickness of tumour (according to Biopsy layer)

Sanchez Ortiz staging – combination of both above.

**Q: How will you manage melanoma?**

A:

- Stage I: (localized lesion) = excision of primary tumour is adequate
- Stage II (mets to one regional area) = excision of primary with 1cm margin + excision of LN mets (B/L) + chemo (cisplatin/Paclitaxel/ Ifosfamide/ PIP)
- For advanced tumour Clarks stage IV & V Breslow thickness >1mm → partial penectomy + Bilateral (B/L) inguinal modified dissection + chemo.

**Q: what if penile growth biopsy report comes as sarcoma?**

A:

- usually of vascular origin FI/by neurosarcoma, fibro sarcoma
- Sarcoma classification → superficial → integumentary supporting structures  
→ Deep → from corporeal body (deep to Bucks fascia)
- Mx – superficial sarcoma – small- less than 2 cm → local excision  
Superficial sarcoma – large – size more than 2cm → partial Penectomy  
Deep sarcoma – any size – partial penectomy

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Local recurrences are common
- No need of nodal dissection if no LNs are palpable.

**Q: How will you resect Paget's disease?**

A: 3 cm margin with frozen section.

**Q: what if penile growth biopsy is Lympho reticular malignant neoplasm?**

A:

- usually Leukemia
- Mx – medical Mx- chemotherapy
- 

Type of tumour	Primary Mx	L.N dissection
Basal cell Ca	Wide excision >2cm margin	-no need
Melanoma	Excision	Must for high grade
Sarcoma	Excision	Only if palpable
Pagetoid	Wide excision >3cm margin	No need
Lymphoreticular tumour	Medical Mx	No need

**Q: what other organ malignancies can metastasize to penis?**

A: Bladder, Prostate, Rectum

**Q: what are the routes of spread of mets to penis?**

A:

- Direct extension
- Lymphatic
- Arterial, venous

**Q: what are signs & Mx for metastatic involvement of penis by remote primary?**

A: sign: priapism, penile nodularity,

Mx- Partial / complete penectomy

**Q: what is PIPE Test-MRI?**

A: Papaverine induced penile erection Test

- MRI is done after penile erection to correctly stage the local tumour

## **Neeraj Sharma's ...Notes For Urology Practicals**

- In a study from Italy PIPE-MRI is found superior to clinical Exam<sup>n</sup> for staging localized penis.

### **Q: who described DSLN biopsy?**

A: Dynamic Sentinel lymph node biopsy by Hornblass

DSLN biopsy is not available in INDIA

### **Q: what is VEIL?**

A: Video Endoscopic Ingu Lymph node dissection.

### **Q: what are the Ind<sup>n</sup> for Radiological examination (USG / MRI) of groin in Ca – penis?**

A: For inguinal assessment in

- Obese pts
- pts with doubtful examination
- Post op / post radiation.

### **Q: What is the status of USG in Ca – penis?**

A:

- helpful for USG guided FNAC (inguinal Region)
- for detection of corporal involvement (local invasion)

### **Q: What can be the second line chemotherapy in ca penis?**

A: not established--5FU/ Cisplatin / Docetaxel anyone can be used.

### **Q: what are the pre malignant lesions of penis?**

A:

1. Penile cutaneous Horn
2. Pseudo epitheliomatous micaceous
3. BXO
4. Keratotic Balanitis
5. Leukoplakia

### **Q: what is penile carcinoma –in-situ known as?**

A:

- Erythroplasia of Queret (EOQ)– on glans, prepuce
- Bowen disease :- on shaft

### **Q: Can CIS progress?**

A: yes, to high grade in 10-30% cases which leads to invasive tumour.

### **Q: what is the gross appearance of Bowen's disease?**

A:



## **Neeraj Sharma's ...Notes For Urology Practicals**

- Scaly erythema on penile skin, crusted (ulcerated variants may also be there)

5-10% of conversion to invasive Ca

**Q: what is the gross appearance of EOQ?**

A:

- Red velvety patch
- Well define margins
- Associated with discharge
- .

**Q: what is the Mx of Cis?**

A: Bowen's disease – excise (5mm margin)

For glans lesions (EOQ)

- 5% Imiquimod cream
- 5 FU cream
- Laser ablation with NDYAG, KTP
- Radiation therapy

Podophyllin

- Available in India
- As podowart-S paint
- Podowart – podophyllin + Salicylic acid
- 10ml = Rs 75/-

Imiquimod

- Available in India
- As nilwart ( Dr. Reddy's lab)
- Rs. 205/- per 10gm tube

---

### **Differential / Diagnosis for Ca penis**

**(Q) What are the d/ds for ca penis?**

(A) D/D of Ca penis

- Chancre
- Chancroid
- Condyloma accuminatum
- Herpes
- Apathus Ulcer
- Lymphogranuloma venerum
- BXO
- Buschke Lowenstein tumour
- TB ulcer

## **Neeraj Sharma's ...Notes For Urology Practicals**

<b>Benign disease</b>	<b>Causative organism</b>	<b>characteristics</b>	<b>Investigation management</b>
<b>Warts:</b>	HPV infn	Usually painless but may be painful	Mx- Imiquimod cream Podophyllin appl <sup>n</sup> cauterization Liquid-nitrogen Laser ablation
<b>Chancre</b>	Due to syphilis (T-Pallidum)	Painless ulcer Hard edges Non exudative 1-2cm lesion	Ix- dark field exam <sup>n</sup> VDRL  Mx- Penicillin
<b>Chancroid</b>	H-ducreyi inf <sup>n</sup>	Painful ulcer Soft chancre Ulcer forms within 10 days of infn L.N +ve	Ix- ELISA Mx-Antibiotics
<b>L.G.V</b>	Chlamydia	Suppurative lesions of inguinal LN 1 <sup>o</sup> – genital ulcer (3-10 days) Secondary – LN +ve → (10-30 days)	Ix- complement fixation Reaction Mx- Doxy, Tetracyclin.
<b>Condyloma Acuminata</b>	Due to HPV 6,11 (Ca penis – HPV – 16)	Viral disease Genital warts It is a STD	Mx – Podophyllin cream (podowart) Imiquimod cream Laser Liquid nitrogen Cauterization
<b>Genital Herpes</b>	viral disease Caused by HSV HSV -1 above the waist HSV – 2 below the waist	Ulcer occurs within 1-2 weeks of sex Painful , Burning, itch	Mx- acyclovir, Famcyclovir
<b>TB penile ulcer</b>	- Occurs as Primary TB lesion	Painless ulcer with excavated margins	AKT

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Buschke lowenstein  
tumour**

Same as giant Condyloma

Same as Verrucous  
carcinoma

**Q: what are the pre-malignant lesions for ca penis?**

(A)

- BXO
- Leukoplakia
- Cutaneous horn
- Pseudo-Epitheliomatous micacious
- Keratitis Balanitis

**Q: what are the Carcinoma –in –situ lesions for ca penis?**

A:

- Erythoplasia of queret
- Bowen's disease

**Q: what is a wart?**

(A)

- warts are small whitish lesions, rough blister
- Typically located on human hands, feet
- Usually painless; but occasionally painful
- Caused by H.P.V virus (HPV-11,6)
- If these warts appear on genitals they are called condylomata acuminata.
- Prevention – Gardasil
- Rx
  - Imiquimod cream (moderates the immune system)
  - Laser ablation
  - Cautrization
  - liquid nitrogen cryotherapy
- "Verruce" means "warts" in latin
- "verrucous" means covered with wart or wart like projections.

**Q: what is a Buschke Lowenstein tumour?**

- Same as = VERRUCOUS Carcinoma = giant acuminata (also called Snuff – diaper's cancer)

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Carcinomatous growth covered by warts or in the form of warts
- Low grade malignancy
- Also Known as giant Condyloma acuminata (i.e., Condyloma acuminatum which is giant )
- Pre malignant lesion; due to HPV
- Mx of Buschke lowenstein tumour-Surgical excision

### **Q: what is a Condyloma Acuminata?**

- "condy" → sex/ Genitals
- Condylomata → multiple condylomas
- Condyloma acuminata : Genital wart due to virus HPV-6,11
- Also called venereal warts
- Type : STD
- Organism: HPV virus
- Status : contagious
- Location: tip of penis (corona)
- Growth: small warts appear as clustered growth and eventually confluence to form big growth
- Mx: podophyllin, Imiquimod (nilwart),laser liquid nitrogen Cautrization,5 FU.

### **Q: what is a Chancre: (pronounce= shangkar) (French = little ulcer)?**

- Painless ulceration
- Usually due to syphilis (primary)
- Appears 21 days after exposure (sex)
- T.Pallidum (spirochete)
- Size 1-2 cm
- On anus, penis, moth , vagina
- Ix: dark field exam / antigen- Haemagglutination, VDRL- Antigen
- Mx : penicillin

### **Q: what is a Chancroid?**

(A)Chancroid: (means – like chancre but not exactly chancre)

- Soft chancre
- Painful chancre
- STD
- Caused by H.Ducreyi (bacteria)
- Erythromatous papule → Pustule 4-7 days → ulcer 8-10 days
- Size :1-5 cm

Irregular, ragged, undermine borders

With painful / tender lymphadenopathy, Ing lymph nodes

Swollen L.N are buboes.

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Ix- ELISA
- Mx: Erythromycin, Azithromycin

**Q: what are the Differences between chancre & Chancroid?**

A:

**Chancre:**

- Painless
- Syphilis (T-Pallidum) ,
- Ulcer @ 21 days
- Non exudative
- Hard edge
- May heal spontaneously in 6 wks

**Chancroid**

- Painful
- H.Ducreyi (Bacteria)
- ulcer @10 days
- Pus exudates
- Soft edge
- Grows, if not treated

**Q: what is a TB ulcer of penis?**

- Primary tubercular lesion
- Oro-genital transmission
- Very rare

**Q: what is a Herps (genitalia)?**

- Genital herpes
- HSV-1 above the waist, HSV – 2 below the waist
- Appear as clustered vesicles on outer surface of genitals (glans)
- 4-7 days after sexual exposure (vesicles)
- Painful, itching, burning
- Ix- viral culture
- -Biopsy
- Mx: Acyclovir famcyclovir

**Q: what is a Apathus ulcer & Behcets disease?**

- Small ulcers in oral cavity & genital s skin are called Apathus ulcer/ Behcets disease.
- Cause trauma, viral, irritation
- Relapsing, ulcerative, non healing, muco-cutaneous disease
- Painful ulcers
- Rx- Symptomatic, ' Zytee' gel

**Q: what is a Lymphogranuloma venerum (LGV)?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Granulomatous lesion of Lymph node due to Veneral Causes
- Also called Durand-Nicolas disease / lymphogranulum Inguinale
- Caused by Chlamydia
- Primary as infection of lymphatics & LN

In primary stage

- 3-10 days of inf<sup>n</sup>
- Small mucocutaneous genital ulcer
- Heals spontaneously.

In secondary stage (10-30 days later upto 6 months)

- Unilateral (2/3) } lymphadenopathy
- Bilateral (1/3) } ↓

Buboes



Necrosis



Ulceration

Ix: Complement fixation, PCR

Mx: Doxy, Tetracyclin, Erythromycin

Compl<sup>n</sup>: elephant leg, (due to lymphatic obstruction)

**Q: what is Radical circumcision?**

A:

- Done for Ca-penis prepucial lesion
- The inner prepucial skin is dissected / cut from corona; almost stripping clans

**Q: what other blood Ix will you do in Ca penis ?**

A: HIV, HBsAg → due to high risk behavior of patient

**Q: what is neurovascular bundle of Walsh?**

A:

- Most distal branches of pelvic plexus.
- Cavernosal artery & nerve that travel ahead, after branching of prostatic, capsular nerves.

**Q: what is alcock's canal?**

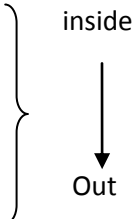
A:

## **Neeraj Sharma's ...Notes For Urology Practicals**

- It is also known as pudendal canal
- It is a fascial compartment on the lateral wall of ischiorectal fossa containing pudendal arteries, pudendal veins & pudendal nerve
- Alcock canal syndrome leads to pain in sitting position & delayed bulbocavernous reflex

### **Q: what are the layers of penis?**

A:

- A- Albuginea
  - B/C -Bucks fascia  
-circulation
  - D -Dartos
  - E -Epidermis / skin
- 

### **Q: what is perineum & its Boundaries and parts?**

A: Perineum is the diamond shaped space lying below the perineal diaphragm

Boundaries

- Ant : Pubic symphysis
- Post : coccyx
- Laterally: Ischio-pubic rami & Ischial tuberosities.

Components:- line joining two Ischial tuberosities divided perineal diamond into two triangles

- Urogenital triangle-- Upper triangle is urogenital triangle
- Anal triangle-- Lower triangle is anal triangle

### **Q: what is urogenital diaphragm?**

A: Musculofascial diaphragm that fills the gap of pubic arch.

Urogenital diaphragm has two membranes one towards prostate and other towards perineum (inferior) the inferior fascial membrane is called perineal membrane.

### **Q: what is superficial perineal pouch?**

A: it is a closed space bound between (skin + colle's fascia) & perineal memb(deep).

- Posteriorly colle's fascia & perineal memb fuse
- Laterally bound by pubic rami & ischial tuberosities
- Anteriorly it communicates to superficial (scarp) fascia of ant abd wall.

### **Q: what are the contents of superficial perineal pouch?**

A:

- Bulb of urethra
- Crura (root of the penis)

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Bulbo spongiosus
- Ischio Cavernous muscles.

### **Q: what is deep perineal pouch?**

A: Deep Perineal pouch is the space that lies between the superior memb (towards prostate) & the deep memb (perineal memb) of urogenital diaphragm

For all practical purposed deep perineal pouch is same as urogenital diaphragm.

### **Q: what are the contents of deep perineal pouch?**

A:

- Membranous urethra
- Sphincter urethra
- Bulbourethral glands
- Deep Transverse perinei muscles
- Internal pudendal Art & vein
- Dorsal nerve of penis/ clitoris.

### **Q: what is dorsal nerve of penis?**

A: As the pudendal nerve exits from the alcock's canal, it divides into three branches

- Superficial perineal N. -- Supply scrotum
- Deep perineal N. → supplies sphincter
- Dorsal N. of penis → supply glans

Dorsal N of penis accompanies the internal pudendal artery and ascends along the rami of ischium. It then runs forward (&climbs up) along the margin of inferior pubic rami b/w the layers of urogenital diaphragm. It pierces the inferior memb of urogenital diaphragm (perineal memb) and then runs b/w layers of suspensory ligament and lands on (reaches) dorsum of penis.

- It runs deep to buck's fascia; over albuginea to terminate in glans.
- There are two dorsal Genital nerves –right and left. Each run on the side of deep dorsal veins.

### **Q: what happens when dorsal N of penis is injured?**

A: loss of sensation from glans & skin of penile shaft

### **Q: what is the female analogue of dorsal genital nerve of penis?**

A: Clitoral nerve

- The course of clitoral nerve is identical to dorsal nerve of penis
- Clitoral nerve is injured in TVT/TOT operation, espl. During "Outside-in" technique.



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**Guideline Statements for Ca Penis**

**Q: what are the pre malignant lesions & Cis lesions for ca penis?**

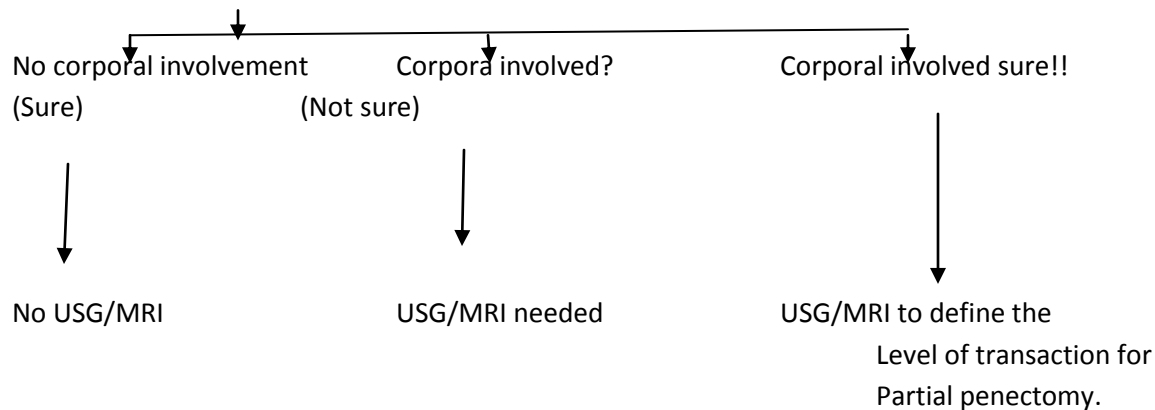
A:

- Erythroplasia of Querelet
  - Bowen's disease
- } CIS
- 
- 'BXO-- Rx clobetasol ointment
  - Cutaneous horn
  - Pseudo epitheliomatous micaceous
  - Keratitis Balanitis
  - Leukoplakia
- } Pre Malignancies

**Q: what are the guidelines statement for diagnosing primary & staging primary ca penis?**

A: Biopsy – Diagnosis

Staging – clinical examination is sufficient



**Q: what are the guideline statements for staging L.N status?**

A:

1. If no inguinal LN → then No iliac LN
2. No need for CT pelvis if inguinal LN is negative
3. Clinical examination of groin is sufficient enough to declare groin negative
4. USG groin needed if pt is obese / post radiotherapy or doubtful findings
5. CT pelvis should be done if inguinal LN are +ve.

**Q: what are the guideline statements for palpable LN?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A:

- More than 50% of palpable LN are inflammatory (Hornblase)
- Wait for 6 wks (after penectomy) for inflammation to subside, use antibiotics in this period
- If nodes still persist → Do FNAC → Excision Biopsy.

**Q: what is the minimum nodal size a CT & PET / CT can detect?**

A:

- CT scan – minimum 1 cm
- PET-CT – 0.5 cm
- PET-CT is better

**Q: what is the status of FDG-PET-CT?**

A:

- PET/CT should be done to see for distant mets
- Early mets can be detected by FDG-PET
- The role of FDG-PET-CT is not so established

**Q: what are the guideline statements for Mx of primary lesion in Ca-Penis?**

A:

CIS (T1s)	5FU cream , Imiquimod cream (1 <sup>st</sup> choice)
Ta (verrucous)	1 <sup>st</sup> choice- excision (alternative Mohs micrographic Sx)
T1a	Local excision, NDYAG laser
T1b-	1 <sup>st</sup> wide local excision + skin Transplantation if needed 2 <sup>nd</sup> laser excision (wide) 3 <sup>rd</sup> Glansectomy
T2 (of glans)	– total Glansectomy
T2 (of shaft)	– partial penectomy with 1 cm margin
T3	– total penectomy with spatulated perineal urethrostomy
T4	– neo adj chemo Response good → Sx (total penectomy) -Response Bad → continue chemo / radiotherapy

## Neeraj Sharma's ...Notes For Urology Practicals

**Q: what is the guideline statement for role of radiotherapy for primary lesion?**

A:

- for selected T1 of glans
- For salvage therapy as part of multi modality treatment

**Q: what are the guideline statements for chances of L.N. positivity and Mx of non palpable LN.?**

A: for Non palpable LN (Oranellas et al) (Brazilian study)

T stage	% chance positivity	Treatment recommendation
T1s, Ta, T1G1	( only 10% +ve)	surveillance
T1G2	No LVI → only 25 -35% +ve)	Observe surveillance
	LVI +ve → (40-50% +ve)	Surgery
T1G3, T2T3,T4	(50-70% +ve)	Surgery

**Q: what is the probability of non palpable nodes with micromets?**

A:

- Low risk – 10%
- Intermediate risk – 30%
- High risk – 50%-70%

**Q: In DSLNB; when is Tc 99 nano colloid injected?**

A: Ninety nine, nanocolloid, night before Sx

Nanocolloid, night before Sx.

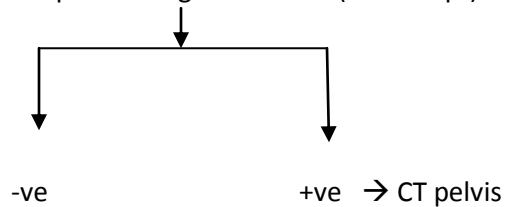
**Q: What is the sensitivity of DSLNB?**

A: > 95%

**Q: How will you manage palpable LN in low risk pts?**

A:

Step 1 – USG guided FNAC (low risk pt)



Step 2. Antibiotic X 4 wks

Step 3. Repeat FNAB Biopsy on 29<sup>th</sup> day

step.4 : Excision Biopsy (if needed)

**Q: How will you Mx palpable LN in high Risk Pt?**

A: T1G3, T2, T3, T4, LVI +ve or LN +ve (FNAC proved) → Ilio-Inguinal dissection straight away.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: when will you do pelvic dissection?**

A:

- When Cloquet LN is +ve on Frozen section  
Or more than 2 inguinal LN is +ve
- By the time contralateral superficial inguinal dissection is finished the frozen section report of ipsilateral side comes.
- If frozen section is +ve then pelvic LN dissection is finished.

**Q: In which cond<sup>n</sup> (of palpable LN) will you not do pelvic lymph node dissection?**

A: If on frozen section

1. No lymph nodes are +ve
2. Only one intra nodal metastasis +ve

Then there is no need to do pelvic dissection. (most of the Indian teachers may disagree with this, so answer with caution)

**Q: what is the incision of choice for B/L Pelvic dissection?**

A: suprapubic midline vertical

**Q: can you do DSLNB for palpable LN?**

A: No, Contra indicated

**Q: when will you give adjuvant chemotherapy?**

A: More than 1 node +ve after ilio ing dissection pN2-pN3

- 3 cycles of Cisplatin (+) 5 FU-(PF) / PIP/ TIP

**Q: how will you Mx N2 clinical (N2 – bilateral)?**

A: Clinical N2 – Bilateral (mobile)

Do FNAC

If positive Neo adjuvant chemotherapy...FI/by B/L Complete dissection

**Q: what is the guideline statement for clinical N3?**

A: up front chemotherapy (involving Taxanes)

PIP/TIP = Paclitaxel, Ifosfamide, P cisplatin.

**Q: In most of the urological malignancies nodal involvement means advanced disease ( for chemo / hormonal Mx). Why in Ca-penis surgical lymphadenectomy is at fore-front?**

A:

- Ca-Penis is squamous cell carcinoma. Biology of sq. CC exhibits a very prolonged loco-regional disease before metastasizing.
- Not sensitive to chemo / radio
- Surgical removed is best cure

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is 5 yr survival of penectomy +pN1?**

A: 60-80%, 5 yr survival

**Q: what are the prognostic molecular markers for survival?**

A: Prognostic markers Sq.cell Ca (penis) are

TP53, MMP-9, S.C.C antigen HPV-16, E.cadherin, Ki-67

**Q: what is kroon's algorithm?**

A: kroon's algorithm is for non palpable LN (N<sub>0</sub>) disease

- Step 1...Do USG-groin
- step 2...FNAC (usg guided)
- step 3....Lympho scintigraphy along with sentinel LN biopsy

**Q: controversy of when to do lymphadenectomy?**

A: For Clinical stage N<sub>0</sub> disease: stratify the risk and do lymphadenectomy (inguinal) for B/L groins simultaneously for high risk N<sub>0</sub> disease. As there is no hurry; inguinal L.N.D can be done safely after 4 weeks; when inf<sup>n</sup> subsides.

For mobile groin L.N: Srinivasan et al (1987) described that 50% of such pts have inflammatory L.N hence a dictum of 6 weeks antibiotics was given followed by Ing L.N sx. But this significantly delays Ing L.N. management and affects Surgery (kroon et al). To negotiate the dilemma now a (usg guided) FNAC (of palpable L.N) is done at immediate post penectomy time and FNAC is +ve go ahead with early Sx & if FNAC is -ve then one can wait & give 4-6 wks of antibiotics (EAU-2004)

**Q: what is the false -ve rate for FNAC**

A: 20-30% false negative

**Q: what should be done then for LN. Negative?**

A: Clinical correlation; grade; LVI; perineal invasion cumulative a decision should be made.

**Q: How will you follow-up, the pt of Ca-penis?**

A:

Rx given	For yr 1-2	For yrs 3,4,5	Total upto	Components of fl/up
Penile preserving T1a, Ta, T1 <sub>b</sub>	@ 3 months	@ 6 month	5 yr	Phy exam <sup>n</sup> only of penis & groin
Penile amputation	@ 6 mo	@ 12 mo	5 yr	-do-
Nx	@ 3 mo	@ 6 mo	5 yr	do-
N <sub>0</sub>	@ 6 mo	@ 12 mo	5 yr	Phy exam + USG

→ groin +/-FNAC

N<sub>+</sub>

@ 3 mo

@ 6 mo

5 yr

Phy Exam + USG →  
groin +/- FNAC

---

**PENIS : Penile Anatomy**

**Q: Where is the root of penis fixed?**

A: Superficial perineal pouch (pubic rami B/L)

**Q: What are the layers of Tunica Albuginea?**

A:

- On corpora cavernosa-two layer – outer longitudinal, - inner circular
- On corpora. Spongiosum-single layer.

**Q: What are the glands of urethra?**

A: Littre's Glands

**Q: What are the layers of penis?**

A:

- **A** – Albuginea (inner most).
- **B & C** – Buck's fascia (Artery vein & nerve lie below the bucks fascia)
- **D**-Dartos
- **E** – Epithelium (skin) (outer most)

**Q: what are the ligaments of penis?**

A:

- Fundiform ligament (fibrous fascia connecting Rectus sheath & Buck's)
- Suspensory ligament (fibrous sheath b/w pubic symphysis & Bucks)

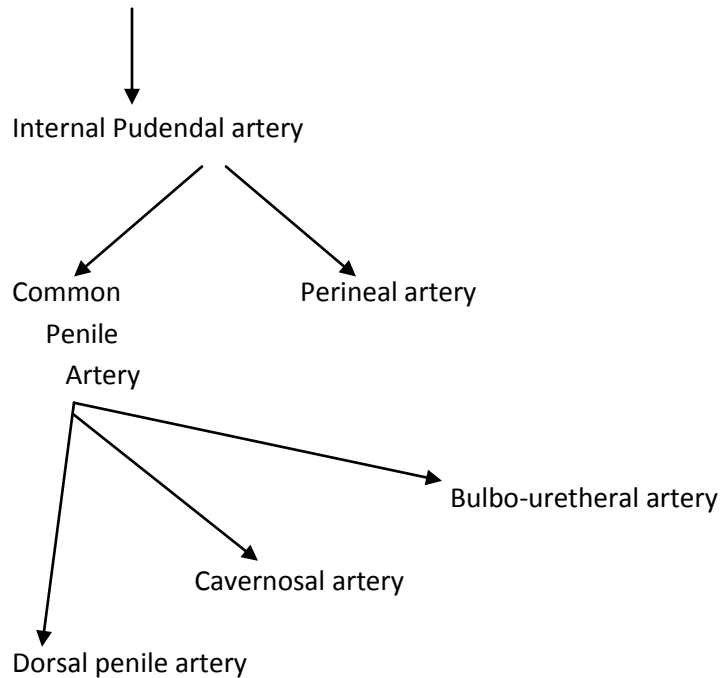
**Q: what are the qualities of penile shaft skin?**

A:

- Extensible
- Freely mobile
- Devoid of hairs
- Devoid of fat
- Folds back over glans as fore-skin
- Supplied by ext. Pudendal artery (B/O femoral Art)

**Q: what is the blood supply of penis?**

A: Common penile artery B/O Internal Pudendal Artery  
Internal Iliac Artery



**Q: what are the branches of common penile Art?**

A:

1. Dorsal penile art:

- Passes between two Crura of penis & pubic bone and reach the dorsal surface of penis
  - Artery runs between vein & nerve
  - Vein @ 12' o clock
  - Artery @ 11 & 1' o clock
  - Nerve @ 10 & 2' o clock
- } all lie below the bucks fascia
- It is the alternate blood supply to the urethra ( all most safe division in Sx for strictures)

2. Bulbar Urethra Artery

- Supplies – Bulb of urethra
- Urethra
- Spongiosum & Glans

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Main / Principal supply to Urethra
- 3. Cavernosal artery
  - Enters the erectile tissue

**Q: what is the most common variation on penile arterial supply?**

A:

- Accessory pudendal artery (70%)
- Resection of accessory pudendal artery during Rad. Prostatectomy may lead to vasculogenic impotence.

**Q: How the venous drainage of penis?**

A: all the small veins join to form a dorsal vein of penis, which drains into pre-prostatic plexus. Small venules run obliquely between layers of albuginea, compression of these sub-tunical venules → erection.

**Q: what is the nerve supply of penis?**

A:

- Sensory: dorsal nerve of penis
- Erectile: Cavernosal nerves
- Para sym: Ach, N.O.

**Q: What is Alcock's canal?**

A: It is an anatomical structure through which the

Pudendal Art	}	Passes from pelvis and emerges out in superficial perineal space
Pudendal Vein		
Pudendal nerve		

---

### **MOCK EXAM 2013- CASE**

35 y/m- H/O partial penectomy 6 months back now got recurrence @ penis

Gen Exam NAD

Local Exam: 7 cm fungating mass on penile shaft

Meatus not seen

Foul smelling discharge +

B/L Inguinal L.N +ve > 4cm

**Q: what are the causes of rapid recurrence within 6 months of Sx?**

A:

- Penile sarcoma
- Kaposi's sarcoma (usually not A/W L.N)
- Hemangiopericytoma
- Melanoma



## **Neeraj Sharma's ...Notes For Urology Practicals**

- +ve Margin during initial partial penectomy

**Q: What will you do next?**

A: Do Biopsy-if previous papers are not available

**Q: How can you avoid positive margins?**

(A)

- Pre OP – MRI
- Intra OP – Frozen section

**Q: If the Biopsy comes as +ve margin?**

A: Revision surgery with frozen section

**Q: what will you do next?**

A:

- RFT;CBC
- CECT abd + Pelvis for L.N.
- CXR-PA

**Q: What are the prognostic factors for Ca-Penis?**

A:

- stage of Tumour
- Nodal Involvement
- Grade of Tumour

**Q: what will you do for this pt**

A: Neo adjuvant chemo Rx

Total Penectomy with perineal urethrostomy

+

Antibiotics for 4 weeks

+

B/L Complete ilio-inguinial dissection

**Q: what is the definition of N<sub>3</sub> disease?**

A: B/L fixed nodes;

Or single mobile LN. > 4 cm

**Q: what is advantage of giving Neo adjuvant chemo Rx?**

A:

- Down stage the tumour
- Treat micro mets
- Assess prognosis

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What chemotherapy will you give for N<sub>3</sub> ?**

A: 4 cycles of TIP – Paclitaxel, Ifosfamide, Cis-Platin.

**Q: What are the chances of Contra-lateral occult mets with ipsilateral palpable nodes?**

A: >30%

---

### ***Lets revise ...ca-penis...***

1% :- Incidence of Ca – Penis

10% :- Incidence of Ca- penis in BXO

Cubilla Classification :- Histological classification

Broder's classification → Histological grading system

Jackson's system :- staging system

5 mm – Margin clearance of Grade I & II

10 mm – Margin clearance of Grade III

Ficara's – Prognostic factors / nomogram

93% - Sensitivity of FNAC

200% - Specificity of FNAC

Cabanas: Sentinel L.N

Daseler's – Inguinal L.N groups

Rosenmuller's LN: Cloquet's L.N

Catalona : Opn modified inguinal dissection

PIP=TP : Paclitaxel 175, Ifosfamide 1200, Cisplatin 25 mg/m<sup>2</sup> cycle every 3 wks X 3cycles

60 Gy : Radiotherapy done

Iridium 192 : Brachytherapy

Optional chemo Px : Cisplatin + 5-Fu

Cloquet L.N: Situates B/w Femoral vein & lacunar ligament

Skinner flap : scrotal rotational flap

Taba – Tabaei flap – abd wall flap

Clark's staging: melanoma @ depth of invasion

Breslow's: staging, melanoma, @ Thickness of Tumour

Sanchez-Ortiz: staging melanoma, combination of above two

Fermuxtran: Iron – oxide nanoparticle for MRI

Pre-malignant lesions: Penile cutaneous horn

: Pseudo-epitheliomatous micacious

: BXO

: Keratotic Balanitis

: Leukoplakia

Non Sq cell cancers:

:Basal cell

## **Neeraj Sharma's ...Notes For Urology Practicals**

: Melanoma, sarcoma, Paget's, Lympho-reticulum  
Cancerous in situ: Bowen's disease

: Erythroplasia of queret

30% → CIs converts to high grade cancer

: Chancre, Chancroid, Condyloma-acuminata

: Herpes

: Aphthous ulcer

: Lymphogranuloma venerum

: BXO, Bushke-Lowenstein tumour

: Tuberculous

Snuff – dipper's cancer = verrucous carcinoma

Behcet's disease = Aphthous ulcers

Chancroid → ducreyi

Durand – Nicholas disease = Lympho Granuloma Inguinale

LGV = Chlamydia

Alcock's canal = Pudendal canal.

Histological classification → Cubilla classification

Histological Grading system --. Broder's grading

Old Staging system → Jackson's staging

Prognostic factors → Ficara's Prognostic factors

FNAC  $S_n/S_p$  → 93% sensitivity, 100% specificity

Sentinel I.n. → cabana's L.N.

Inguinal I.n. Groups → Dressler's L.N. group

Cloquet's LN → Rosenmuller's

Superficial Inguinal dissection

Modified sup +deep Ing dissection → Catalona Op<sup>n</sup>

Chemo Rx → TIP/PIP → Taxane (Paclitaxel) 175 mg/m<sup>2</sup>

Ifosfamide = 1200mg

Cisplatin – 25mg/m<sup>2</sup>

Cycle of TIP → 3 cycles every 3 weeks

E.B.R.T – 60 Gy, Brachy – 60Gy (in 10 ds)

Brachy – Iridium 192

Skinner flap → scrotal flap

Taba Tabaei flap—abdominal flap

Melanoma staging – Clarks → Depth of invasion

Breslow → Breadth (thickness) of tumour

Iron Oxide MRI → Fermuxtran MRI

Pre malignant lesion → Penile cut Horn

Pseudo epithelial micacious

Keratotic Balanitis

Leukoplakia

## Neeraj Sharma's ...Notes For Urology Practicals

BXO

Carcinoma in sites – Bowen's disease  
Erythroplasia of Quelet

D/D – Ca-penis →

Chancere, chancroid, Condyloma acuminata,  
Herpes, Aphthous, LGV, BXO  
Buschke Lowenstein, TB

Non sq ca penis –

- Basal cell
- Melanoma      Paget's      Lymphoma
- Sarcoma

Verrucous Carcinoma

LGV – Chlamydia Trachomatis

Hanks solution for L.N. biopsy

Tensor fascia lata

Endovascular stent

S.F junction

Verrucous Ca= Giant Condyloma acuminata

HPV-16

Gardasil, Cervarix

Mohs micrographics Sx

Sx margin 5mm 10mm

Cis → 5 FU, Imiquimod

L.N % →    low risk 0-5%  
                 Intermediate 20-30%  
                 High risk 40- 60%

Orneblase et al Brazilian study EAU - 2004

Dynamic Sentinel L.N. Biopsy ;:- Hornblase

Basal cell Ca	Wide excision 2 cm	No need
Melanoma	"	Must (high grade)
Sarcoma	"	only infection palpable
Pagetoid	"	no need
Lympho Ret	medical Mx	----

## Neeraj Sharma's ...Notes For Urology Practicals

Post for VEIL

Podophyllin → Podowart S (salicylic acid)

10 ml = Rs 75/-

Imiquimod → Nilwart (Reddy's labs) Rs. 205

Dorsal Genital nerve of penis

DSLN:  $^{99}\text{Tc}$  Nano colloid + methylene Blue

Bucks fascia

Blood supply of penis → Internal Pudendal artery



Common penile – Dorsal Penile artery

- Corporal – Artery

- Bulbo – urethral artery

Ponchetti study → size of penis

Factors predicting inguinal node mets – Grade, - LVI, - Palpable nodes

Components of flap – Physical examination

- USG groin (optional)
- For post Sx
- For radiotherapy

Chemotherapy

Dose

Taxane – Paclitaxel

75mg/m<sup>2</sup> I.V @ 21 days + 5mg Prednisolone

Docetaxel

Ifosfamide

1200 mg/m<sup>2</sup> infusion X 5 days @ 21 days

Add MESNA

Cis Platin

20 mg / m+2 x 5d @21 days+Mgso<sub>4</sub> + hydration

Side effects

fluid retention,

Paraesthesia rash,

alopecia

hemorrhagic cystitis

confusion

Somnolence

Nephrotoxicity

Oto toxicity

peripheral neuropathy

electrolyte imbalance

---

**Partial Penectomy**

**Ind<sup>n</sup>:** - Invasive tumours involving the glans & coronal sulcus T1

**C/ Ind<sup>n</sup>** - tumours involving proximal corpora cavernosa (Should be offered total penectomy)

**Safe Margin:** 2cm of normal tissue proximal to margin of tumour infiltration

**Aim:** 1. adequate tumor control  
2. Ability to stand and micturate

**Anesthesia:** Spinal /GA

**Position:** Supine

**Incision:** circumferential incision 2.0cm proximal to lesion.

**Procedure:**

1. ↓G/A, under antibiotic cover, supine position, a thorough painting and draping done.
2. Tumour covered with sterile glove and stitched
3. A penrose drain is applied as a tourniquet at the base of penis
4. Circumferential incision is made 2.0 cm proximal to the lesion
5. Skin is incised circumferentially
6. Superficial & deep vein are ligated & cut
7. Buck fascia is incised circumferentially
8. Tunica albuginea of the corpora and corpora cavernosa are divided sharply down to urethra ( may be sent for frozen section)
9. Urethra is dissected for a distance of 1 cm distal to proximal corpora and then transected (send for frozen section)
10. Corpora are sutured & interrupted horizontal mattress sutures of 2-0 vicryl
11. Tourniquet is removed & hemostasis checked
12. Penile skin is closed in midline using 2-0 chromic
13. Urethra is spatulated dorsally and fixed to the skin with 4-0 vicryl interrupted
14. Deploy Foleys catheter for 2-3 days
15. Dressing applied with Vaseline gauze

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Complications:-**

- Hematoma, bleeding
- Meatal stenosis
- Psychological trauma of penile loss
- Tumour recurrence 0-8%
- Splaying of Urinary stream
- Loss of Sexual function (80%)

### **Q: how will you fl/up this patient?**

A: Physical Examination of penile stump & inguinal region for nodes

As per EAU guidelines

@ 2 month for 1-2 yr

@ 3 month for 3<sup>rd</sup> year

@ 6 month for 4<sup>th</sup> year

@ 12 month for life

additional I<sub>x</sub> like USG inguinal region CXR / CECT pelvis as needed  
SOS

### **Q: How can you add length to the remnant penile stump?**

A:

- Suspensory ligament of penis can be divided
- 'Z' plasty of penoscrotal region to better define the penile stump

### **Q: What is the TNM staging of ca penis?**

A: T<sub>x</sub>, T0

T<sub>is</sub> Carcinoma in situ

Ta Non invasive verrucous carcinoma

T1 Tumour invades sub epithelial connective tissue

T1a without LVI, not poorly differentiated

T1b With LVI, poorly differentiated

T2 Invades corpus spongiosus / corpus cavernosa

T3 Invades urethra

T4 Invades adjacent organ / structures

N<sub>x</sub>, N<sub>0</sub>

N1 Palpable mobile unilateral single LN

N2 Palpable mobile multiple Unilateral or Bilateral L.N.

N3 Palpable fixed inguinal LN, pelvic L.N.

M<sub>x</sub> M<sub>0</sub>

M1 Distant metastasis (including L.N mets outside True pelvis)

### **Q: Describe the cross sectional anatomy of penis?**

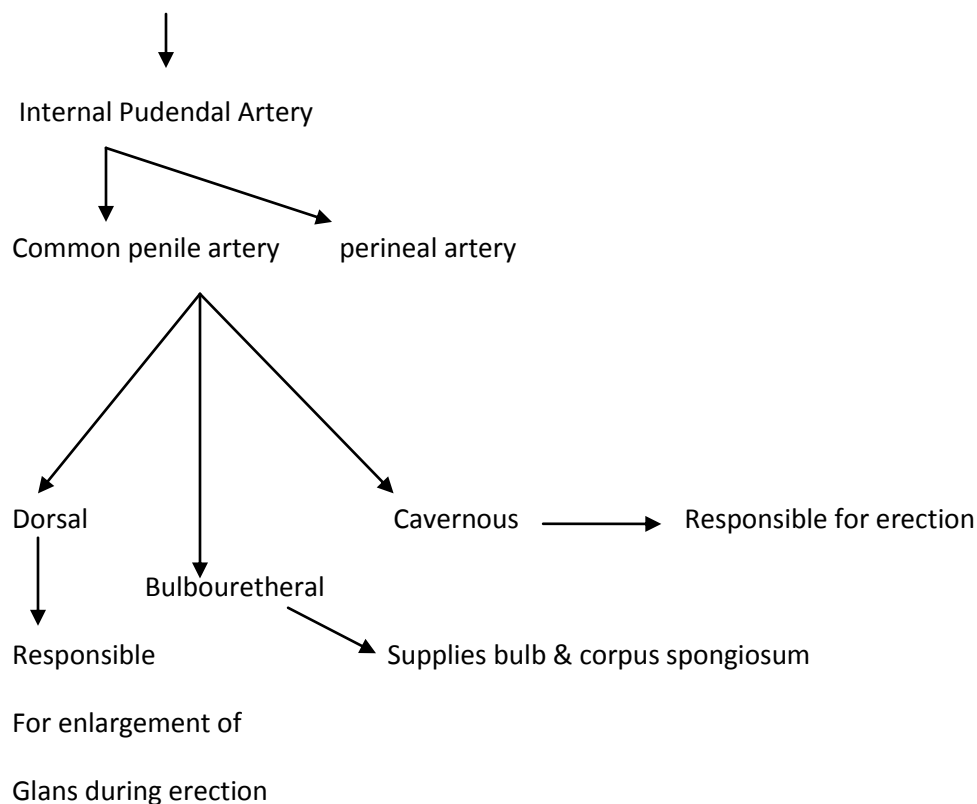
A:

## Neeraj Sharma's ...Notes For Urology Practicals

- Outer most skin
- Dartos
- Superficial Penile artery(B/o ext. pudendal art) vein nerve
- Bucks fascia
- Deep dorsal penile artery (B/o int. pudendal art) nerve vein
- Albuginea
- Corpora cavernosa
- Corpora spongiosum
- Urethra

**Q: Describe the blood supply of penis?**

A: Internal iliac artery



**Q: Describe the Venous drainage of penis?**

A: superficial veins → drain to saphenous vein,

Deep dorsal vein: Joins the periprostatic Venous Plexus → Plexus of Santorini

Infra pubic veins: Emissary vein draining the proximal corpora join to form corporal & crural vein

These join with peri urethral veins to form int. pudendal veins.



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T <sub>2</sub>	Invades corpus spongiosus / corpus cavernosa
T <sub>3</sub>	Invades urethra
T <sub>4</sub>	Invades adjacent organ / structures

N<sub>x</sub>, N<sub>0</sub>

N <sub>1</sub>	Palpable mobile unilateral single LN
N <sub>2</sub>	Palpable mobile multiple Unilateral or Bilateral L.N.
N <sub>3</sub>	Palpable fixed inguinal LN, pelvic L.N.

M<sub>x</sub> M<sub>0</sub>

M <sub>1</sub>	Distant metastasis (including L.N mets outside True pelvis)
----------------	---

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- Bucks fascia

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Deep dorsal penile artery (B/o int. pudendal art) nerve vein
- Albuginea
- Corpora cavernosa
- Corpora spongiosum
- Urethra

### **Total Penectomy**

**Indication:** - Larger Extensive, infiltrating ca penis (T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>), local excision is inadequate.

**Position:** - Lithotomy (extended lithotomy)

**Anesthesia:** GA / SA

#### **Procedure:**

1. ↓G/A, painting & drapping done
2. Tumour covered with glove.
3. Elliptical incision around base of penis
4. 12' o clock dissection upto pubic symphysis. All vessels are ligated & cut. Deep dorsal vein, & arteries ligated & cut.
5. suspensory ligament & fundiform ligament of penis cut
6. Penis is reflected cranially upto abdomen. Dissection begins at 6' o clock urethra looped & separated & cut
7. Corpora cavernosa dissected upto ischioepubic rami, sutured, ligated with 2-0 vicryl and then cut
8. Specimen delivered out.
9. Urethra is tagged with 3-0 chronic for identification. Urethra dissected upto urogenital diaphragm
10. A 2 cm incision is made in perineum and a tunnel created under subcutaneous. Urethra brought down to perineum through tunnel. Save bulbourethral artery to supply bulbous urethra. Corporal branch of Bulbo-urethral Art is sacrificed.
11. Urethra is brought out of perineal incision.
12. Urethra spatulated dorsally and perineal urethrostomy done by fixing full thickness urethra to skin.
13. Foleys deployed (to be removed after 5 ds)
14. Original scrotal incision is closed transversely to lift up the scrotum away from urinary stream
15. Compression dressing done, scrotal support for 24 – 48 hours

#### **Complication:**

- Meatal stenosis
- Hematoma
- Psychological trauma
- Splaying of urine stream

**Sentinel L.N. Biopsy**

**Indication:** Clinically node negative disease with invasive sq. cell ca on penectomy / partial penectomy specimen (T<sub>2</sub>)

**Position:** Supine

**Anesthesia:** S/A, G/A

**Incision:** 5cm Incision; parallel to inguinal crease and centered two finger breadth lateral & inferior to pubic tubercle

**Procedure:**

1. 15 – 30 min before surgery 2ml of methylene blue is injected into the lesion and around the lesion
2. Patient can be anesthetized before the inj<sup>n</sup> / or after the methylene blue injection
3. 5cm incision is made B/L (on both sides) two finger breadth lateral & inferior to pubic tubercle
4. Skin & camper fascia are incised
5. Scarpa fascia incised and superficial inguinal triangle dissected.
6. Upper flap raised and the sentinel blue node is searched for, dissected & removed.
7. Usually supra-medial group of "Dressler" L.N. is also removed (if sentinel LN is not a part of it)
8. A small drain kept & closure done

**Q: Who described sentinel L.N. dissection?**

A: Cabanas

**Q: What are the principles behind sentinel L.N dissection?**

A: Ca-penis has a very predicted and organized spread. Thus sentinel LN should be involved before the tumor involves any other region

If sentinel L.N is negative; it is highly unlikely to get tumor spread anywhere else.

**Q: what is the success/ failure rate?**

A: 80-90% success, 10-20% false negative

**Q: What can be done do decrease the false negative?**

A: Pre op USG, Dynamic Lympho scintigraphy – Described by Hornblass & Kroon

**Q: What is dynamic lymphoscintigraphy?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A: A day prior to surgery:  $^{99}\text{Tc}$  labeled nanocolloid is injected at 3-4 sites around the primary tumor. (total dose 50m Bq)

Nuclear scans are taken and location of the sentinel lymphnode is marked on skin (including the depth from skin)

10 min before surgery methylene blue is injected

Sentinel L.N. is then harvested using

- Dissection of blue lymphatics
- Intra op use of gamma camera
- Previously marked node site

**Q: How will you send these nodes?**

A: dissected nodes are sent in formalin

**Q: when will you do local tumor excision?**

A: after completion of sentinel L.N biopsy; the partial penectomy / local excision / total penectomy is performed

**Q: How will you define vascular endothelium invasion on biopsy?**

A: Tumour cells within endothelium lined spaces.

**Q: How will you send the FNAC samples of L.N.?**

A: FNAC samples (USG guided/palpable) can be

- Directly fixed on slide with alcohol & air dried.
- Hank's (Buffered balanced salt soln.) solution can be used.
- Hanks solution contains  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{HCO}_3^-$ ,  $\text{Ca}^{++}$  in optimal quantities.

---

**Radical Ilio Inguinal L.N. Dissection**

**Indn:**

Ca penis + Palpable L.N. +ve  
+ FNAC +ve LN;

**Timing:** 4-6 weeks after surgical Rx of primary tumours

**Anesthesia:** S/A, G/A

**Boundaries of dissection** (It is not Incision).

- Superior: draw a curved line joining ASIS & Pubic Tubercle
- Medially: Drop vertical line 15cm from pubic tubercle
- Laterally: Drop vertical line 20cm from ASIS
- Inferiorly: Join the Medial & Lateral lower ends

**Incision:** 3 cm below & Parallel to inguinal ligament extending from lateral to medial border.

**Procedure:**

1. Deploy foleys , mark boundaries and make the incision
2. Raise the flaps – upper flap upto 4 cm above the inguinal ligament. Inferior flap upto the limit of the dissection
3. Fat and areolar tissue is dissected from the ‘external obl. Aponeurosis & spermatic cord’ to the inguinal ligament.
4. Long saphenous vein is identified and divided. Great saphenous vein may be spared also.
5. Dissection is deepened through fascia lata at Sartorius muscle laterally and adductor longer medially (TFL can also be opened in midline from fossa ovalis to apex of femoral triangle)
6. Apex of the femoral triangle is reached
7. Femoral Art & vein dissected by opening their compartments.
8. Dissection now starts from apex of the femoral triangle and the Lymph-vascular tissues are raised upwards, along with deep inguinal L.N lying on both the sides of femoral vein, until continuity with pelvic dissection is attained at the femoral canal.
9. The lateral aspect of femoral Art is usually not exposed, thus avoiding injury to femoral nerve & profunda femoris artery.
10. The L.N. mass is then delivered out.

**Closure:**

- Secure hemostasis

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Copious wash
- Sartorius roll → The sartorius muscle is mobilized from its origin @ ASIS and transported 180° to cover femoral vessels muscle is then sutured to Ing ligament and adjacent muscles.
- Deploy a drain & fix
- Closure of the flaps done
- If needed scrotal skin rotational flaps (skinner) an abdominal wall advancement flaps (taba-tabei) or rectus muscle flap may be taken .
- Skin flaps should be tucked to underlying muscles

---

### **Part II – Pelvic Dissection**

Incision→ for unilateral dissection: Gibson's

For Bilateral dissection: midline vertical

Nodes removed: common iliac, ext. iliac , Obturator nodes

Keep drain & close layer wise

Post Operative:

2-3 days Bed rest & comprehensive stockings

5<sup>th</sup> day drain removal

Low dose cephalosporin x2 months

Complications:

- Lymphocele
- wound inf<sup>n</sup>
- necrosis
- Lymphedema of lower limbs
- flap necrosis

**Q: What are the various incisions for ilio inguinal dissection?**

A: for unilateral- Lazy 'S'; Gibson's

For bilateral- vertical midline infra umbilical

**Q: What are the Boundaries of femoral triangle?**

A:

- Superior : Inguinal Ligament
- Medial : Adductor Longus
- Lateral : Sartorius
- Floor : Pectineus & Adduction Longus – medially  
Ilio-psoas muscle – laterally.
- Roof : Fascia lata

**Q: What are the contents of femoral triangle?**

A: from Lateral to Medial--Nerve, Artery, Vein, and L.N.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the clinical significance of femoral triangle?**

A: all Angioplasties  
Arteriographies  
Vascular Stenting

} Done through femoral triangle

### **Modified Inguinal Lymphadenectomy**

#### **Ind<sup>n</sup>.**

1. High Risk patient with clinically Non Palpable L.N.  
T<sub>1G3</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub>, LVI+, high grade histology
2. The Contralateral (normal/non palpable L.N.) side in case of Unilateral Palpable LN

**Anesthesia:** S/A, G/A; Deploy Foleys catheter.

**Position:** Frog legged position.

#### **Key aspects of the procedure:**

1. Shorter skin incision
2. Exclude the area lateral to femoral artery. Exclude the area caudal to fossa ovalis.
3. Preservation of saphenous vein
4. Eliminating the need of transposing sartorius muscle.
5. Thick skin flaps, including skin → camper fascia → fascia scarpa.
6. Deploying a small negative S<sup>n</sup> Drain.

#### **Procedure**

**Incision:** 10 cm long incision, starting from the pubic tubercle, 2 cm below inguinal crease

Procedure:

1. Make the incision in frog leg position
2. Make thick skin flaps including scarpa
3. Raise the upper flap for a distance of 8cm superiorly & 6 cm inferiorly.
4. Superior limit is upto ext. oblique aponeurosis
5. The Fibrofatty tissue just inferior to ext obl. Aponeurosis (& spermatic cord) is dissected & mobilized inferiorly.
  - The Upper flap is retracted using deaver retractor
  - The fibrofatty tissue is pressed with "sponge on a stick" to provide counter traction
  - With the help of right angle artery forceps the fat lymphatics are separated from spermatic cord & base of penis medially.
  - All lymphatics should be properly tied to prevent seroma / collection.
6. Dissection is then commenced in inferior (caudal), direction with the removal of all superficial L.N.
7. Medial Border- Adductor longus muscle, Lateral Border – Sartorius Muscle, is indentified next, to define the boundaries.
8. The Muscles are traced up to their confluence. (at the apex of femoral triangle)



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9. The saphenous vein is identified & preserved. The (Branches/tributaries) of the saphenous vein may be sacrificed.
10. Tensor fascia lata is incised at the medial border and reflected laterally (Tensor fascia lata can be opened at the level of fosse ovalis and then opened is midline to the apex of femoral.) no need to close this fascia lata at the time of closure.
11. Femoral sheath is incised over femoral artery laying open the arterial compartment. Femoral sheath is incised over femoral vein laying open the venous compartment. This femoral sheath is stripped upto apex.
12. The deep L.N. are then removed from their location between artery & femoral vein. Superficial, perforating branches of artery & vein are tied & cut.
13. Specimen is delivered enblock & sent for frozen.

### **Closure:**

- Wound is irrigated liberally
- Drain kept & fixed
- Closure done
- Compressive dressing applied
- Long term antibiotic cover.

### **Q: Who described this modified Ing Dissection?**

A: Catalona

### **Q: What all group of L.N. are dissected?**

A: Superficial → all Dressler's '5' group,  
Deep → deep ing L.N. medial to Femoral artery

### **Q: what is the false negative rate of this Catalona operation?**

A: 5%

### **Q: What will you do if frozen section comes +ve?**

A: Convert & complete the Procedure as Radical Ilioinguinal lymphadenectomy.

---

**Penile Prosthesis Implantation**

**Ind<sup>n</sup>**:- Patients with Erectile dysfunction who have failed conservative approaches like – oral PDE<sub>5</sub> I, vacuum devices ,intracavernosal inj<sup>n</sup> therapies.

**Pre-OP counseling**

- Patient should be made aware of all available choices, their adv & side effects & compl<sup>n</sup>
- Paraplegics, reduced manual dexterity and extremely obese patients are best offered semi-rigid implants

**Pre –OP preparations:-**

- Patient is advised to take scrub bath twice daily from two days before the surgery
- Ext genitalia are again thoroughly examined to rule out any inf<sup>n</sup>, ulcers, boils.
- No shaving prior to day of surgery
- Urine culture should be negative
- Shaving is done on table
- Antibiotic given in the morning of surgery

**Position:-** Supine

**Anesthesia:-** GA/SA + Deploy Foley's Catheter

**Incision :-** Sub coronal, or penoscrotal ,we in our institute usually give penoscrotal incision.

- A 3cm Horizontal penoscrotal incision is made
- Skin, dartos, Colles are incised.
- Bucks fascia is dissected free and urethra palpated with Foley catheter
- Horizontal mattress stay sutures are taken using 2-0 chromic.
- A one cm (1cm) longitudinal incision is made at 4'o clock & 7'o clock (one on each corpora cavernosa).
- Smallest hegar dilator (or any straight metal dilator) is introduced towards the tip (glans) dilation is done upto just across corona
- The same dilator is then used to dilate proximally upto pubic rami
- Gradual serial dilatations done upto 16mm depending upon the cylindrical girth
- A length measurement required is estimated
- Implants are now opened and pushed in till it is felt through glans
- Implant is then folded upon itself and proximal end is shoved in.

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Once the implants have set in position the bucks fascia & albuginea are closed using horizontal mattress suckers of 2-0 PDS.
- Skin is closed using 2-0 chronic catgut
- A gentle pressure dressing is applied

### **Q: How will you do post op care?**

A: Foleys removed next morning, closed suction drain (if deployed) removed next morning

- Discharge next morning
- Oral antibiotics x7 days
- NSAIDS x 7 days
- No heavy work x 15 days
- No sex for 3 months
- Loose clothings

### **Q: What are the complications?**

A: Infection, Perforation, Erosion, S.S.T. deformity (supersonic transport) over sized rod – Buckling effect.

#### 1. Infection:

- By staph. Epidermidis
- Requires per op, post op, intravenous antibiotics
- A/B ampicillin sulbactam, Cephalosporin.
- 7 days post OP oral A/B.
- Antibiotic coated stents/implants use rifampicin +minocycline.

#### 2. Perforation

- It is the sudden give way during dilatation of corpora
- Usually occurs on medial side on the proximal aspect near pubic rami
- Small crural perforation does not matter
- If urethral perforation occurs during the procedure, procedure should be abandoned, deploy Foleys for 14 days
- Perforation can be avoided by pointing the urethral dilator tip laterally during dilation.

#### 3. Erosion:

- Occurs as late compl<sup>n</sup>.
- In cases of semi rigid implements the eroded side only can be removed
- If erosion occurs in urethra → deploy Foleys for 14 days.

#### 4. SST deformity

- Due to short rods
- glans is unsupported
- Supersonic craft like nose
- Correction: 1. Re-do the operation with correct sizing, 2. Dorsal plication of glans

#### 5. Buckling deformity :-

## **Neeraj Sharma's ...Notes For Urology Practicals**

- over sized rod
- Re-do operation

### **Q: What are the types of prosthesis available?**

A:

- Semi rigid Rod – AMS malleable 600, AMS malleable 650.
- Positional- Dura II
- Two piece inflatable – AMS Ambicor
- Three piece inflatable - AMS 700 CX/LGX

### **Q: What approaches can be used for penile prosthesis implantation?**

A:

- Subcoronal incision
- Penoscrotal incision (m/c)
- Infra pubic approach

### **Q: What care will you take in peno-scrotal approach.?**

A: Peno scrotal approach required differentiation of corpus cavernosa from corpus spongiosum during dissection; so initial Foleys placement is must.

### **Q: what are the components of a three piece inflatable system?**

A:

- Inflatable implant rods: a Pair of inflatable rods.
- Pump; Placed in scrotum,
- Reservoir: placed in abdomen

### **Q: How will you adjust the length of implant rods?**

A: By using rear tip extenders.

### **Q: What is semi rigid rod made up of?**

A: Inner metal ring / coil covered by silicon coated

### **Q: How is penis kept after semi rigid implant, when it is not used?**

A: Loosely strapped to abdomen covered under loose clothing wears



***Neeraj Sharma's-***  
**NOTES FOR UROLOGY PRACTICALS**

*Carcinoma testis*

**Q: What is the Incidence of testicular tumour by age?**

A: 20-30- yr – NSGCT

30-40 yr – seminoma

More than 50yr – lymphoma

Spermatocytic seminoma – 60-70 yr

**Q: What are chances of Bilaterality?**

A: 2%

**Q: What are the risk factors?**

1. Cryptorchidism – 4-6 times in ipsilateral testis, 1-1.5 times in c/lat testis.
2. Family H/O – R.R – brother 8-12 times, -father 2-4 times
3. Personal H/O of testicular tumour (12 times risk) (3% incidence)
4. ITGCN– 50% in 5 yrs , 70% in 7 yrs
5. Microlithiasis
6. Down syndrome
7. Klinefelter's syndrome

**Q: How Cryptorchidism acts as a risk factor?**

A: - 4-6 times the risk

-2-3 times risk if timely Orchidopexy is done

- Seminoma type

- 1-1.5 times risk in contralateral testis

**Q: In what % of ca Testis, ITGCN is found in Rest of the adjacent parenchyma?**

A: 90% (therefore complete  $O_x$  (orchidectomy) & not partial  $O_x$ )

**Q: What is the risk of ca testis in a k/c/o ITGCN?**

A: 50% in 5 yrs, 70% in 7 yrs

**Q: What is % risk of finding ITGCN in a Testis?**

A: 5-10% if no +ve history,

30% if H/O Cryptorchidism

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the role of microlithiasis in a ca testis?**

A: not proven; 2% patients of microlithiasis have ca-testis

**Q: what will you ask in childhood history (what anomalous condition are a/w ca testis)?**

A:

- Hypospadias
  - Cryptorchidism
  - Ambiguous genitalia
- } at birth
- 
- H/O maternal expose to androgens
  - Maternal H/O alcohol / drug abuse
- 
- 
- Subfertility – (in youth)
  - Family H/O –brother, - father

**Q: What type of tumour is a/w undescended testis?**

A; Seminoma

**Q: What is the responsible gene?**

A; Gain of 12 p chromosome

Tumour specific Yp gene

**Q: from which cells; ca Testis arises?**

A; arrested primordial Germ cells

**Q: What is the classification of Testicular Tumours?**

A: WHO Classification

- Germ cell tumours
- Stromal tumours
- Both germ cells & Stromal
- Unclassified
- Lymphoid & Hemopoietic
- Tumours of supporting structures – tunica, - epididymis, - spermatic cord.

**Q: What are the histological types of NSGCT?**

A: Embryonal

Yolk sac

(If a tumour has both seminoma & NSGCT component it is R<sub>x</sub> as NSGCT)



## **Neeraj Sharma's ...Notes For Urology Practicals**

Teratoma

Chorio-carcinoma

Mixed ..... most NSGCTs are mixed

**Q: what is the age peaks in Testicular tumours?**

A: Infancy → Pediatric ca testis

20-40 yrs → NSGCT / seminoma

50-60- yrs → Lymphomas

**Q: which malignancy is more common than ca-testis in 20-40 yr age?**

A: Leukemia

**Q: what is the most common stage of presentation?**

A: Localized seminoma

**Q: What is % distribution of testicular tumors between seminoma & NSGCT?**

A: 55% Seminoma

45% NSGCT

**Q: What is the area wise distribution of GCT?**

A: 80-90% Gonadal

10-20% extra gonadal primary

**Q: What is the risk of GCT in @ testis if other testis undescended?**

A: 1.5-2 times

**Q: What are the m/c syndromes a/w testicular cancers?**

A: Down syndrome,

Klinefelter's syndrome

**Q: What conditions are a/w mediastinal NSGCT?**

A: Klinefelter's syndrome, down syndrome, Leukemia

more components of yolk sac tumour in mediastinal NSGCT

**Q: Which tumour (GCT) doesnot arise from ITGCN?**

A: Spermatocytic Seminoma

**Q: Is ITGCN common in adults or children?**

A: Adult GCTs

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: If the O<sub>x</sub> Specimen contains ITGCN a/w ca testis what does it implicate?**

A: nothing; no prognostic significance

ITGCN present in 80-90% cases

**Q: What are the immune markers in seminoma?**

A:

- CS-117 → + (cluster differentiation (CD) are cell surface markers recognized by antibodies)
- PLAP → ++++ (Placental alk. Phosphatase → ↑ in seminoma cannot be used as marker in smokers as PLAP is 10 times in smokers)
- CD-30+ (neg) (-)
- OKT (-)

**Q: In a known case of Klinefelters syndrome, what kind of testicular tumor can occur?**

A: 1. Gonadoblastoma

, 2. Mediastinal NSGCT

**Q: If the O<sub>x</sub>-HPE report is s/o spermatocytic seminoma what does it implicate?**

A: The Rx is complete i.e., O<sub>x</sub> (Benign Lesion) ( no further evaluation , no Bilaterality/no mets/ , no H/O Cryptorchidism, no PLAP / i 12p

**Q: What are pediatric age groups GCT?**

A; yolk sac tumour (mediastinal presentation),  
Teratoma

**Q: what are features of yolk sac tumours?**

- Pediatric age group
- Always produce AFP
- Never produce HCG
- Schiller Duval Bodies
- Low risk of Relapse

**Q: What are the characteristics of Embryonal carcinoma?**

A:

- Aggressive tumour, mostly undifferentiated,
- Acts as prognostic marker for R.P lymph node occult mets
- Usually normal serum markers
- But produces Beta HCG
- PLAP +ve
- OCT-3/4 +ve

If EC(+ve) in orchidectomy specimen CT chest recommended due to high chanced of pulmonary mets

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: if a Patient presents with shock in emergency following previous day chemo Rx for mediastinal mass, what type of malignancy you suspect?**

A:

- Choriocarcinoma
- Notorious to bleed after chemo Rx

**Q; what is Hurricane Tumour?**

A: Choriocarcinoma

Tremendously fast spread

Hematogenous spread

Aggressive Tumour

**Q; what are other characteristics of Choriocarcinoma?**

A: Hematogenous spread to lung & Brain

Secretes Beta HCG

**Q: What is the Monster Tumour?**

A; Teratoma

- Contain elements of atleast two Germ cell layer
- Type 1. Mature – differentiated – well encapsulated, multiple cysts ,Mature tissue
- Type 2. Immature →undifferentiated, - immature tissue, - espl. Neuroepithilium

**Q; What are characteristics of Teratoma?**

A:

- a/w Normal serum markers
- 40% of adult GCTs
- 80% of pediatric GCTs
- Chemo resistant
- Uncontrolled growth & invasion of nearby structures.

**Q: What is growing Teratoma syndrome?**

- Local over growth of teratoma after chemotherapy
- Local invasion
- In NSGCT patients only
- Metastatic nodal mass↑↑ in size despite chemotherapy
- Markers are normal

**Q: when can ca testis patient have pain?**

A: <10% presentation,

Pain is due to infarct,

Pain due to hemorrhage

**Q: what can all be presenting modes of ca testis?**

A; Testicular Mass

- Vague discomfort
- Testicular heaviness
- Loss of testicular sensations

Retroperitoneal mass:

- Palpable mass
- Abd Pain
- Flank pain (due to ureteric obstruction)
- Back pain (nerve involvement , psoas involvement)
- IVC compression - lower limb edema
- -G.I symptoms
- Pulm. Mets : cough, chest pain, hemoptysis
- Gynecomastia (2.7 % patient) usually associated with non-seminoma tumor
- Supraclavicular L.N. mass

**Q; why is there Loss of testicular sensations in ca testis?**

A; because of pressure atrophy of neuronal endings between growing mass and testicular capsule (albuginea)

**Q: How does supraclavicular L.N. gets involved?**

A: Testicular mass → R.P. L.N → cysterna chyli

→ Cysterna chyli → Thoracic duct → Left subclavian vein

Supraclavicular L.N. drains into Jn. Of Thoracic duct & left subclavian vein. Tumours cell reflux from thoracic duct to supraclavicular LN

**Q; what is the supraclavicular L.N. called?**

A; Virchow's LN

**Q: What % of patients present with gynecomastia?**

A; 2%

- Leydig cell tumours → gynecomastia
- ↑ HCG level; ↓ androgen level, ↑ estrogen production

**Q: In which Testicular tumour patients will you do semen exam & why?**

A:

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Unmarried male
- Married but without children

Because Testicular tumour patients have diminished fertility

### **Q: What is relevant past Sx/ Medical history in testicular mass cases?**

A; Scrotal/ inguinal Sx → changes draining areas.

Medical H/O—fever, dysuria, STD, DM,

### **Q: What else will you ask in history?**

A: Detailed H/O scrotal swelling

- Aggressive factors
- Increasing or ↓ in size
- Relation on lying down / cough
- H/O trauma

### **Q: What are your D/Ds in testicular mass cases?**

A

- Ca – testis
- Epididymo orchitis
- Hernia/ hydrocele / hematocele / varicocele
- Para Testicular Neoplasm

### **Q: What is your next step in investigation?**

A: 1. USG scrotum – 100% sensitivity

2. Testicular markers

### **Q what is Spermatocoele?**

- Collection of sperms in epididymis or vas
- Intrascrotal mass
- Usually @head of epididymis
- Usually painless
- Usually size ≤ 1 cm
- Usg-scrotum s/o Hypoechoic cysts
- Doppler: falling snow appearance
- Mx → Excision of Spermatocoele

### **Q: Will you CECT before OX, or after OX?**

A: after orchidectomy

After semen storage (CECT can harm spermatogenesis)

### **Q: what features are s/o malignancy on USG?**

A: On high freq. probe (7.5 – 10MHz)

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Hypo echoic (10-20% iso echoic)
- Less Vascularity
- Texture –1.Homogenous → seminoma,
- 2.Heterogenous → NSGCT,
- 3. Cystic Features → Teratoma components.

### **Q: What is burnt out Primary?**

A: normal Testicular exam clinically, but presence of advanced GCT features like raised serum Markers and RPLN mass

On USG, Burnt Out primary will be seen as scarred / calcified areas

### **Q: How can primary disappear?**

A: Infarct,  
Immunity mediated

### **Q: What are other Testicular lesions on USG?**

A;

- Testicular Cysts,
- infarct,
- Hematoma,
- epidermoid cyst,
- nodules,
- TB granuloma,
- Leydig cell nodules, Leydig cell tumours,
- sertoli cell tumours

---

## ***Tumour Markers***

### **Q: What is the best marker?**

A: AFP → if raised → NSGCT / yolk sac / EC

If normal → seminoma / chorio-carcinoma teratoma, benign lesion

Pure seminoma – AFP -- normal

- ➔ Produced by yolk sac cells hence ↑ due to yolk sac component
- ➔ AFP is raised in 50-70% of NSGCTS

### **Q: what is normal value of AFP?**

A: Upto 10mg/ml

### **Q: which other malignancies raise AFP?**

A: Hepato-cellular, GI, Stomach, Pancreas, Lung

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Which other benign Diseases ↑ AFP?**

A: Hepatitis, auto immune diseases, Pancreatitis, alcohol induced, drug induced

**Q: What is T-half life duration of AFP?**

A: 2-6 days

**Q: what is T-half life duration of Beta HCG?**

A: 24-36 hrs

**Q: In which Testicular Malignancy Beta HCG ↑↑?**

A: NSGCT → (Chorio- carcinoma, EC),

15% cases of seminoma,

Beta HCG is raised in 50-70% of NSGCT

**Q: what are the causes of false +ve Beta HCG ↑↑?**

1. Cross reactivity with luteinizing hormone
2. Cross reactivity with FSH
3. Non Testicular Malignancy – Pancreatic, Billiary, Ovarian, liver, Breast
4. Marijuana use / smokers

Normal value of beta HCG is less than 5 m.I.U. / ml. The HCG hormone is measured in milli-international units per milliliter (mIU/ml).

**Q: why use measure Beta HCG & not total HCG?**

A; Because alpha components is similar to pituitary hormones and thus cause false values ; so only beta HCG is measured

**Q: which LDH isotype is used for detection?**

A: LDH –I (one)

**Q; what is half life Time duration of LDH?**

A: 24 hours

**Q: What are causes of false +ve LDH?**

A: MI, hemolysis, Rhabdomyolysis, Muscle diseases

**Q: When will you do serum markers?**

A: Pre OP & post O<sub>x</sub> Day 21

According to half life of markers, usually after 21 days

**Q; can only ITGCN disease raise markers?**

A; only ITGCN cannot raise markers

**Q: What markers are used for staging?**

A: Post Orchidectomy markers

---

**Management**

***High Inguinal Orchidectomy***

**Q: Within what duration will you do O<sub>x</sub> after diagnosis?**

A: within 2 weeks

**Ind<sup>n</sup>:** Suspected /known Carcinoma Testis

**Pre Op Preparation:** Nothing specific

Part Preparation

**Anesthesia:** GA/ SA/ LA

**Position:** Supine

**Incision:**

- 5-7 cm oblique incision
- In the inguinal region
- Parallel to inguinal crease
- 2 finger breadth above increase

**Procedure:**

- A 5-7 cm inguinal incision is made ,2 finger breadth above the inguinal crease
- Camper & scarpa fascia incised in the line of incision
- Ext. oblique. Aponeurosis opened in line
- Ilio inguinal nerve is dissected & free & preserved
- Spermatic cord looped with tape
- Dissect the spermatic cord 1cm deep to DIR
- Separately ligate the vas using silk (non absorbable)
- Put a soft clamp on cord
- Deliver the testis out of scrotum and dissect all the attachments of gubernaculum
- Perform Schivasu's procedure if needed, Otherwise go ahead for orchidectomy
- Bifurcate the cord, clamp, cut and ligate & transfix using non absorbable silk.
- Check hemostasis
- Close the external oblique aponeurosis, using prolene 2-0
- Approximate the scarpa (deeper)
- Close skin with staples
- Scrotal compressive bandage applied.



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Adv**

- Minimal morbidity
- Day care surgery
- Exact histopathology of tumour
- Proper 'T' staging of tumours
- 70% - 80% CS-I stage tumour orchidectomy is the complete cure
- Orchidectomy O<sub>x</sub> is complete cure for spermatocytic seminoma, Leydig tumour and sertoli cell tumour.

### **Complications**

- Bleeding, Hematoma, Seroma
- Skin inf<sup>n</sup>

### **Q: What are the Ind<sup>n</sup> for Partial O<sub>x</sub>?**

A:

- Organ confined disease of size <2 cm
- No ITGCN is adjacent Testicular Parenchyma
- Patient agreeing for regular fl/up
- Bilateral tumours
- Pediatric teratoma
- Epidermoid cyst

### **Q: how will you do Partial O<sub>x</sub>?**

A: Schivasu's maneuver

- Clamp the cord, bivalve the testis, remove the tumour,
- Testis Albuginea closed e 4-0 vicryl running. Close the tunica vaginalis
- Done under condition of cold ischemia
- Always accomplished by Testicular Biopsies of @ Parenchyma for ITGCN
- Four Biopsied from tumour bed → send for frozen section

### **Q: How many biopsies will you take?**

A: Two (in bouin sol<sup>n</sup>.)

### **Q: What will you do if ITGCN is +ve?**

A: Radiation therapy to Testis.

### **Q: What are the testosterone level results after Partial O<sub>x</sub>?**

A: 90% Patients maintain normal Testosterone level.

### **Q: What is delayed O<sub>x</sub>?**

A: When chemotherapy is given first, followed by radical O<sub>x</sub>.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the Ind<sup>n</sup> for delayed O<sub>x</sub>?**

A: advanced germ cell tumors with metastasis & raised markers.

**Q: What will be the histological finding in O<sub>x</sub> specimen after systemic chemo R<sub>x</sub>?**

A: 25% will still have viable GCT.

30% will have Teratoma

**Q: What constitutes scrotal violation?**

A: scrotal O<sub>x</sub>,

Transcrotal biopsy /FNAC,

Precision Hydrocele, Hernia S<sub>x</sub>

All these lead to aberrant lymphatic drainage

**Q: What are the Implications?**

A: Increases the chances of local recurrences from 0.3% to 3.0%

**Q: What should be done for Pts of scrotal violation?**

A: They should not be kept on surveillance:

For seminoma → ipsilateral Groin & scrotum should be included in Radiation area,

For NSGCT → Spermatic cord remnant should be excised at the time of RPLND

**Q: What I<sub>x</sub> is done next?**

A: Repeat serum Testicular markers after 21 days

CECT abdomen & CXR-PA/CT Chest: for complete staging

**Q: Why 'High' Inguinal orchidectomy?**

A: If RPLND is needed in future then cord remnant can be easily removed

Micromets in cord are dealt with

**Q: How will you do high inguinal O<sub>x</sub>?**

A:

- Inguinal incision
- Clamp the cord before testicular mobilization
- Separately ligate the Vas
- Bifurcate the cord & tie
- Tie the cord 1 cm deep to in DIR
- Cord vessels are ligated with non absorbable sutures

**Q: which nerve will you preserve?**

A: Ilio inguinal

**Q: what is Schivasu's maneuver?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A; Control clamp spermatic cord and deliver the testis. (Keep the ice around, let testis cool down)  
vertically bivalve the testis → send HPE/Frozen

**Q: what is most common complication of Schivasu's maneuver?**

A: Bleeding, Hematoma

**Q: What are the independent poor prognostic factors for NSGCT?**

A: EC, LVI positive, Tunica Vaginalis invasion Positive

**Q: What is scrotal violation?**

A; Trans scrotal Biopsy

H/O -testicular biopsy for evaluating Azoospermia etc.

**Q: What is Prognostic Significance of scrotal Violation?**

A: after scrotal Violation Local Recurrence 2.9 % v/s 0.3% in inguinal Ox

- Chances of local recurrence increases 10 times
- No difference in systematic relapse / survival

**Q: what will you do for cases of scrotal violation?**

A:

- seminoma → Radiotherapy to inguinal region
- NSGCT: remove the scrotal scar at the time of RPLND
- Don't keep these patients on surveillance
- Remove cord stump @ RPLND

**Q: When can you do partial O<sub>x</sub>?**

A:

### **Condition**

- Solitary Testis with Normal testosterone levels
- Benign tumor
- Suspected Lesion with normal Testicular markers

### **Pre- requisites**

- Mass less than 2 cm
- Absence of ITGCN in remaining parenchyma is the single most imp factor Tumour
- volume <30% of testicular vol.

**Q: what is the Rx of only ITGCN in solitary Testis?**

A: 15- 20 Gy EBRT radiation @ 2Gy per sitting

**Q: What is delayed Orchidectomy?**

A: 1<sup>st</sup> chemo Rx then Orchidectomy later on

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what can you do to prevent tumour in remaining part of solitary testis?**

A: 20Gy Radiotherapy

**Q: what are the ind<sup>n</sup> for biopsy of C/L testis?**

A: indications for Biopsy of C/L Testis ( open inguinal or gun biopsy)

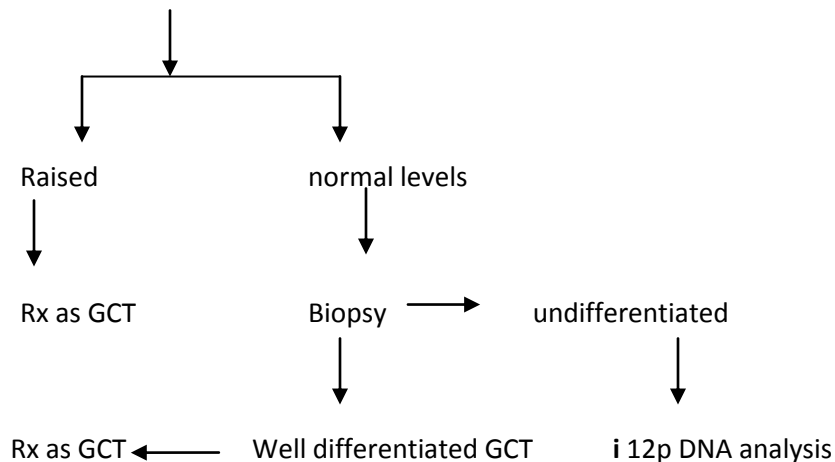
- Atrophic Testis (on opposite side) (size <12ml)
- H/O Cryptorchidism (on opposite side)
- Decreased spermatogenesis
- Suspicious lesions on USG (in opp. testis)

**Q: how many shots of biopsy (gun) will you take from C/L testis?**

A: 2 (double biopsy)

**Q: How will you manage a young male with midline mass with normal testis?**

A: Do testicular Markers



**Q: will you do orchidectomy (Ox) for RPLN mass / Mediastinal mass with normal Testis?**

A; Yes, Testis may harbor dormant malignant cell so in a case of GCT do Orchidectomy (O<sub>x</sub>) for RPLN mass /Mediastinal mass with normal Testis

**Q: Which testis will you remove Right or left?**

A: As per Lymphnode distribution area or USG evidence of Burned out primary.

**Q: Which staging is used?**

A:-

- AJCC staging ( Post Ox)
- Serum markers in staging are post Ox values.

**Q: What is the group staging of Ca testis?**

A;

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Stage 0: ITGCN only
- Stage 1: Confined to testis , - 1A – Purely confined to testis, 1B- LVI+, TV+
- Stage 2: L.N.     2A - <2cm,                      2B- 2-5 cm,     2C - > 5cm
- Stage 3: mets     3A – non regional LN,   3B – Lung Mets ,   3C – extra pulm. Visceral mets.

**Note that there is no stage 4 in ca – testis**

---

### **Drainage to Retroperitoneum**

**Q: what is the pattern of spread / mets to RPLN?**

A; Predictable pattern, No skip mets

Retro peritoneal spread right to left

**Q: Which GCT is the exception?**

A: Choriocarcinoma (hematogenous spread)

**Q: What is drainage pattern of right Ca Testis?**

A: Paracaval ↔ precaval ↔ Inter aorto-caval

**Q: What is drainage pattern for left ca Testis?**

A: Para aortic → pre aortic → inter aorto caval

**Q: what does it suggest if external iliac / inguinal LN are involved?**

A: Retrograde spread from retroperitoneal L.N.to iliac LN

High bulk disease,

Aberrant lymphatic drainage due to scrotal violations

**Q: In CS 1 (clinical stage 1) (testis Confined) (CT scan Normal)NSGCT. What % LN are pathologically +VE?**

A: 25-35% in general

- low risk – 20%,
- intermediate risk – 40%,
- High risk – 60%

**Q: what constitutes a +ve L.N on CT?**

A: size >4mm in primary landing area

Size >10 mm outside primary area

**Q: What is the role of FDG-PET in initial diagnosis?**

A: No role in initial staging of seminoma / NSGCT

**Q: What else can you do Retroperitoneal LN staging GCTs?**

A: lap RPLND in CS-I, CS-II A

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the ind<sup>n</sup> of CT chest?**

- Post Ox elevated markers
- Evidence of chest mets on clinical ex
- Mets in CECT- Abd
- Equivocal findings on CXR – PA
- Biopsy report s/o NSGCT + LVI + or EC +ve

**Q: How do chest mets look like?**

A: cannon ball appearance; discrete nodules

**Q: what are the symptoms of chest mets?**

A: Chest pain, dyspnoea, cough, hemoptysis

**Q: what all tumours can spread to lungs?**

A: RCC, Wilms, Ca testis, Neuroblastoma, Ca colon, Breast Ca, Sarcoma

**Q: what is AMBER?**

A; **A**dvanced **M**ultiple **B**eam **E**qualizer **R**adiography → for detection of lung mets

**Q: what is the definite indn for induction chemo (after O<sub>x</sub>)?**

A: Rising Serum Markers

**Q: What will you do if Serum markers are declining after Ox but very slowly?**

A; Rule Out

- Medical causes
- Non Testicular Malignancy
- Very Close fl/up
- CECT –Abd, Chest

**Q: what is IGCCCG Prognostic classification?**

A: Table 31-4 (P-848) Campbell 10<sup>th</sup> edn.

**Q: what is the prognosis of GCT patient?**

5 yr survival

	NSGCT	Seminoma
Low risk	90%	90%
Intermediate	80%	80%
Poor risk	50%	

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What if only ITGCN has been detected (in biopsy) & other testis is normal**

A: Family H/O positive

Personal H/O Positive

H/O crypto-orchidism positive

Patient not amenable to fl/up

→ Orchidectomy, Otherwise for low risk pt.--> Surveillance

**Q: what are semen parameters in Ca Testis?**

A: - 50% oligospermic

-10% Azoospermia

**Q: Will you do semen exam of Ca testis patient?**

A: Preferably yes, espl. If the family is incomplete

**Q: What is the effect of Chemo Rx on semen parameters?**

A: nadir values in sperm counts by 14-15 months

All (100%) will become azoospermic

Return to normal baseline @ 2 YRS= 50%

- Changes of Cyclophosphamide are permanent
- Changes with cisplatin are reversible
- Side effects: Renal damage , oto-toxicity, peripheral neuropathy,
- cisplatin Dose: 20mg /m<sup>2</sup> , day 1-5 every 3 week

**Q: what is the effect of radio Rx?**

A: same as chemo Rx

- sperm counts Return to base line by 3 yrs
- Recovery of spermatogenesis is dose dependent i.e., on the no. of radiations given to testis

**Q: what cells are affected by radiotherapy Rx, leading to infertility?**

A: actively dividing spermatogonia are most susceptible Fl/by primary spermatocytes

**Q: Which cells are affected by chemotherapy that leads to infertility?**

A: sertoli cells, Leydig cells, germ cells,

Spermatogonia are most sensitive, stem cells are more resistant

**Q: what are the side-Effects of Sx – RPLND?**

A: Lead to Ejaculatory dysfunction in > 80-90%

**Q: How will you manage NSGCT-CS-I?**

A: See LVI & EC in HPE report

LVI (-) , EC(-) → low risk → surveillance

LVI +, EC+, → High Risk → chemo

**Q: what are chances of occult L.N. mets in NSGCT\_CS-I?**

A: for low risk = 20%

Intermediate= 40%

High risk = 60%

**Q: What are drawbacks of Chemo Rx?**

A: Side effect of chemo,

- Cardiotoxicity,
- no 2<sup>nd</sup> line chemo → failure means RPLND required
- Doesn't Rx Teratoma
- Fl/up CT scans

**Q: If a patient of NSGCT / Cs-I is kept on surveillance when can relapse occur?**

A; 90% within 2 yrs, 100% by 5 yrs

**Q: Now suppose this patient relapses as RPLN after 2 yrs, what will you do?**

A: If mass > 3 cm  
Elevated markers  
CECT / CXR. Abnormal / mets } chemo Rx first

Mass <3cm  
Normal markers  
CECT CXR Normal } RPLND first

**Q: What is the best Rx?**

A: RPLND + chemo

**Q: what is the best practical approach?**

A: Ox fl/by chemo + fl/up

**Q: what is chemo Rx Protocol?**

A: **B** -Bleomycin 30 units day 2,9,16

**E** -Etoposide 100 mg/m<sup>2</sup> day 1-5

**P** -cisplatin 20 mg/m<sup>2</sup> day 1-5



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what are the side effects of BEP?**

A; Bleomycin side effects- Pneumonitis -Pulmonary fibrosis

Etoposide side effects-BMD, -NVD, Alopecia

Cisplatin Side effects: Renal damage, oto-toxicity, peripheral neuropathy

### **Q: what is the interval between two BEP cycles?**

A: 14 days

### **Q: How will you give chemo therapy?**

A:

- Admit, consent
  - Take I.V line
  - Injn Iso-m (500 ml) with 2 amp  $\text{MgSO}_4$  over 2 hrs
  - NS 100 ml with inj ondansetron 1 amp
  - inj dexona 16 mg
  - Inj avil 1amp IV stat
  - Inj rantac 1 amp IV stat
  - Cisplatin  $20 \text{ mg/M}^2$  in 500ml N.S. x2 hrs (oncoplatin) (Rs. 80/-)
  - Inj Etoposide 100 mg in 500 DNS x  $\frac{1}{2}$  hrs (Rs 270/-)
- } Over 30 min

On day 2

- All above medications plus
- In Bleomycin direct I.V ( Rs.1500/-)
- Watch for pulse /BP/ECG/ Hypo Magnesia

Day 3, 4, 5-----same as day 1

Day 9, 16 – Bleomycin

Gap of 14 days

Then next cycle

### **Q: How will you calculate body surface area?**

A:  $\text{BSA} = 2\sqrt{\text{ht (cm)} \times \text{wt (kg)}} / \sqrt{3600}$  Du bois formula

### **Q: What lab investigations will you essentially consider before chemo Rx?**

A:

- Renal fn – (cisplatin)
- Pulm fn – (Bleomycin)
- Sperm Preservation – (optional )
- Tumour Markers

### **Q: what will you do CECT repeat?**

A: 14 days after completion of last cycle

That means Day 60<sup>th</sup> for 2 cycles BEP and Day 90<sup>th</sup> for 3 cycle BEP

**Q: What is prognosis after BEP x 2?**

A: Relapse rate < 5% for NSGCT-CS-1 (LVI+, EC+)

---

*NSGCT Stage II A /IIB*

**Q: What are the pt characteristics for NSGCT Stage II A /IIB?**

- Orchidectomy (Ox) report → s/o NSGCT
- Markers – Elevated
- Nodes → upto 5 cm on CECT abd

**Q: How many pts present as CS-II NSGCT?**

A: 33%

**Q: Do all nodes which are seen m CECT are pathologically +ve?**

A: No, 33% are pathologically negative

**Q: What are the options of Mx ?**

A: Options 1. Primary Chemo (+/- RPLND Later)

2. Primary RPLND (+/- chemo later)

Both have 95% 5 yrs survival & 7% Relapse rates

**Q: what factors decide for plan of action?**

A

- Lymph node mass size → <3cm –Sx or ≥3cm – chemo
- Level of markers if raised → chemo Rx first
- Contralateral L.N, Multifocal LN → chemo Rx first
- Doubtful/equivalent status of mets elsewhere → chemo Rx first
- Presence / absence of Teratoma in Ox specimen
- Presence of suprahilar, pelvic, inguinal, Retrocrural LN → chemo first
- Back pain, Neurological features → chemo Rx first

**Q: how will you now proceed?**

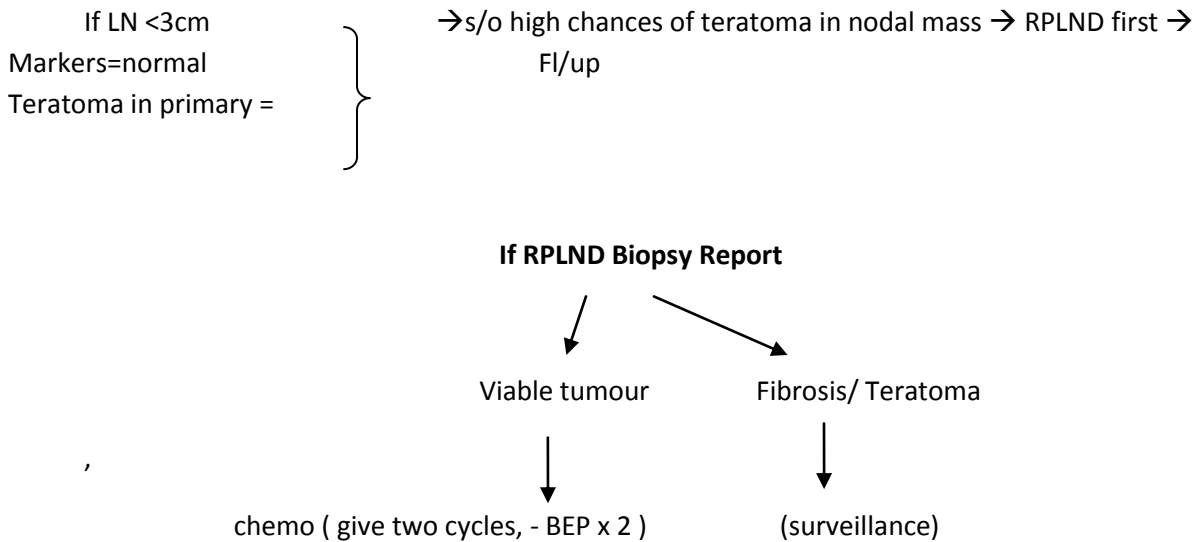
A: If LN mass size >3 cm

Markers elevated → s/o viable tumour

- No Teratoma in primary Ox

Best-Moetzer criteria

} → chemo Rx → BEP x 4 → fl/ up



---

***NSGCT Stage II-c / III***

**Q: what are the typical patient characteristics?**

A: NSGCT on Orchiectomy (Ox) HPE report, and > 5cm mass in RPLN (or mets (III))

**Q: what % of pt of NSGCT will present like this?**

A: 33%

**Q: What are your options for this patient?**

A: BEP x 4 → fl/up → Residual mass → PC Sx

**Q: Do you give 4 cycles to every one?**

A: No, for low risk of patients 3 cycles BEP can be given like

- Primary in Testicular
- Serum markers upto S1
- No non pulm mets

Rest all patients will be given 4 cycles

**Q: will you give BEP to all?**

A: for pt with pulm mets or reduced pulm fn, Bleomycin cannot be given, so..

VP-16(=Etoposide)  
Ifosfamide  
Cis platin

} x 4 is given

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: When will you do fl/up CECT abd after completion of chemotherapy?**

A: minimum 14 days after completion of chemo cycle

**Q: What will you do if after primary chemo Of (BEP x 4) or (BEP x 3) pt develops / residual mass in retroperitoneal space?**

A: Will assess the size of residual mass & Do serum markers

- Any residual mass >1cm → do PC Sx.
  - B'coz.. 40% Teratoma → will be chemo Resistant
  - 20 % viable GCT → only 25% response of 2<sup>nd</sup> line chemo
  - 40% necrosis

**Q: What will be the 5 yr survival after PC Sx?**

A: makes 5 yr survival >50%

**Q: Is there any role Biopsy of mass / FDG-PET (in this case of NSGCT with post chemo mass)?**

A: No role

**Q: What factors can predict Necrosis only state ?**

- Absence of Teratoma in primary
- >90% reduction in primary
- Mass size <1cm
- Normal tumour markers

**Q: How can you predict viable tumour in post chemo residual mass?**

A; Raised markers AFP & HCG

Enhancing mass on CECT

**Q: What will you do for this state of raised markers in post chemo residual mass?**

A; PC Sx first & then 2 additional cycles BEP

**Q: what are good variables in this condition PC Sx patient?**

A; good prognostic factors in PC residual mass Sx patient are

- Complete resection in PC Sx
- Good risk IGCCCG
- Less than 10% viable mass in HPE<sub>x</sub><sup>n</sup>

5 yrs survival

- 90% for no risk factor
- 80% for one risk factor
- 50% for 2,3 risk factors

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what factors are suggestive of Teratoma as post chemo residual mass?**

A: normal markers + HPE<sup>m</sup> of primary Ox s/o teratoma + cystic appearance of mass in CECT

**Q; when will you do FDG-PET in this case?**

A: No role

**Q; What is the exact timing of doing PCSx for residual mass?**

A: Within 4-6 wks of completion of last date of chemotherapy

**Q: How is sexual life after RPLND?**

A: 80 – 90% have antegrade ejaculation preserved if nerve sparing is done  
80% will lose ejaculation if nerve sparing is not done

**Q; How is fertility status after RPLND / chemo?**

A: 75% become father after RPLND

- After BEP<sub>x3</sub> : semen values reach nadir by 14 months
- Come back to normal/ preop state by 3-4 yrs

**Q; what is the most Common side effect of Radiotherapy?**

A: infertility / GI toxicity / Bladder toxicity/ secondary neoplasia

**Q: What is IGCCCG risk Classification?**

Good		Inter mediate		Poor	
NSGCT	Seminoma	NSGCT	Seminoma	NSGCT	Seminoma
Testicular on Retroperitoneal primary	Primary – any site	Primary : testicular or retroperitoneal	any	Mediastinal	No Patients
No non pulmonary mets	Mets – no non pulmonary	No non pulmonary	non pulmonary	Non pulm	
S1 Markers	S <sub>0</sub> markers	S <sub>2</sub> Markers	S <sub>0</sub> Marker	S <sub>3</sub> Marker	
Survival 5 yrs 90%	90%	75%	75%	50%	

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are your components of fl/up examination?**

A: Physical Exam

- Opp Testis
- Abd. Mass
- Chest examination clinical

Tumour markers

CXR-PA

Abd CECT

**Q: What is your fl/up protocol?**

A:

### **For NSGCT-Cs-I**

	Yr-1	Yr -2	Yr – 3-5	yr 6-10
P Phy exam	4times	4 per yr	2 per yr	once per yr
T Tumour marker	4	4	2 per yr	once per year
C CXR-PA	2	2	-	
C CECT Abd	2	2	-	

### **For NSGCT –Cs-II/III/Residual Mass**

Physical exam	4	4	2	1
Tumour markers	4	4	2	1
CXR-PA	4	4	2	1
CECT	2	2	1	1

**+ CT chest & CT Brain as Indicated**

**Q: What is the first line Rx for stage II C /III ?**

A: Chemo, BEP x 4

**Q: what I<sub>x</sub> will you do after chemo?**

A: CECT abd, serum markers, CBC, PFT (if symptomatic), RFTs.

**Q: Suppose post chemo CECT reveals mass what will you do?**

A: for mass >1 cm & normal markers → teratoma 40%, Fibrosis 40%  
Post chemo Sx is advised

for mass < 1 cm & normal markers → .necrosis only, so wait n watch

For mass >1 cm & raised markers → two additional BEP cycles

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What is the timing of post chemo Sx?**

A: After 1 month of last day of chemo Rx

Platelet count  $\geq 1,00,000$  } To enhance recovery GM-CSF (granulocyte-macrophages) is given  
WBC count  $> 3,500 /cc$  } sub cut inj<sup>n</sup> dose is 10 mg/kg/day during 8 -15 days

### **Q: what special Ix will you see before giving chemo (BEP)?**

A: PFTs → Bleomycin side effect → pulm. Fibrosis

RFTs → cisplatin side effect → Nephro toxicity

CBC → Etoposide side effect → bone marrow suppression BMS

### **Q: Which other drug causes pulmonary fibrosis?**

A: Nitrofurantion

### **Q; what if post chemo CECT mass & markers are raised?**

A: Means viable GCT → Repeat Chemo BEP x 2 cycles advised.

---

## **Seminoma CS-I**

### **Q: What are the typical Pt. characteristics in seminoma CS-1?**

A; Post Ox-biopsy seminoma }  
Tumour confined to testis } CS-I  
No mass on CECT }

### **Q: What are Your Rx options?**

A; Surveillance or chemo or Radiotherapy  
2 cycles carboplatin single agent 25 Gy in 20 daily fraction or 100 rads

### **Q: How will you decide adjuvant Rx v/s. surveillance?**

A: see two factors	Low risk	High risk
1. Size of primary $> 4cm$	-	+
2. involvement of rete testis	-	+

Only low risk patients, compliant pts, Informed Pts → surveillance

Otherwise adjuvant chemo / radio

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: How will you follow up pt on surveillance?**

A: PTCC\* @ 3 months → 1-3 yrs

@ 6 month → 4-7 yrs

@ 12 month → 8<sup>th</sup> yr onwards

PTCC \* =Phy ex., Tumour markers, CXR, CECT abd.

### **Q: What is the chance of getting micro mets/nodes +ve in CS-I?**

A: Low risk – 5%

High risk – 15%

### **Q: How will you give chemo? What chemo will you give in CS-1?**

A; Single agent carboplatin x 2 cycles

### **Q; what is the dose of carboplatin?**

A: Dose =  $7 \times (\text{GFR ml/min} + 25)$  mg

For e.g., GFR =75 then dose is =  $7 \times (75+25) = 700$  mg

### **Q: How will you estimate GFR?**

A: - radio isotope nuclear renal scan

- MDRD formula

### **Q: What is the dis adv of chemo Rx?**

A:

- GFR dependent (cisplatin)
- Carboplatin is inferior to cisplatin
- Need for surveillance i.e., CECT
- Side effect s of chemo Rx

### **Q: So what is your preference?**

A: Radiotherapy: - Easy to give, - no GFR dependent, - easy to fl/up

### **Q: What was the standard treatment protocol?**

A; radiotherapy (Fossa et al) (recurrence 1% rate) for seminoma CS-I

### **Q; what is the dose of radiotherapy for seminoma CS-1?**

A; Previous recommended dose 1500 rads

New recommended dose 1000 rads (250 Gy) in 20 fractionated doses

### **Q; what is the field area?**

A: Dog leg (traditional) – covers para – aortic + ipsilateral iliac nodes + pelvic nodes

(New concept: Para – aortic + ipsilateral iliac nodes only)



## **Neeraj Sharma's ...Notes For Urology Practicals**

(Cover scrotum by head shield to avoid exposure of other C/L testis, while giving dog leg radiation therapy)

**Q: what is the recurrence after radiation Rx?**

A:

- Infield recurrence <1%
- So no need for CECT
- Then the most common site of recurrence is Left supraclavicular
- Virtually all recurrence can be cured by chemo Rx

**Q: what will you do for seminoma CS-1?**

A: According to latest EAU 2011 update → radiotherapy is no longer recommended for CS – I seminoma only carboplatin is usually given

---

### ***Seminoma CS – II***

**Q: what will you do for Seminoma CS-II?**

A: Orchidectomy (Ox) + Radiotherapy (for mass < 3 cm)

25 Gy – dog leg area

10 Gy extra to involved nodes upto 1cm margins from node borders to be covered in the field

Ox + Induction Chemotherapy Rx. In CS-II for Mass > 3cm., Multiple L.N. masses ,CS-IIc, CS-III

**Q: Will you give radiotherapy to supraclavicular area?**

A; NO

**Q: What is distinct adv of Radio Rx?**

A: no need of CECT abdomen as in field recurrence is < 5 %.

**Q: when will you give induction chemo Rx?**

A; 1. CS-II, Mass > 3cm.

2. Multiple L.N. masses,

3. CS-IIc, CS-III

**Q: what chemo Rx will you give?**

A; BEP x 3 cycles or EP x 4 cycles

20% relapse, 50% 5 yr survival

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: When you will give BEP x 4?**

A: for intermediate risk seminoma i.e. Non pulmonary mets.

5 yr survival = 80%

Seminoma – Post chemo – mass

**Q: What are pt characteristics for post chemo residual mass ?**

A; Ox-S/O seminoma

R.P.L.N. mass >5cm (IIC)

Chemo given BEP x 3

Now having persistent mass

**Q: what % of patients will have radiologically detectable mass after chemotherapy?**

A; 50 – 80% pts may have radiologically Detectable mass

90% necrosis, 10 % viable tumour

**Q: can these mass spontaneously resolve?**

A; yes 50% resolve by 18 months

**Q: Can you surgically remove this residual mass?**

A; No: Not advisable

- Very difficult dissection due to desmoplastic reaction
- Teratoma is not a concern

**Q: Can you irradiate it with radiation?**

A: no use

**Q: Then what do you want to do?**

A: Risk Stratification

- Mass >3 cm → FDG – PET(after min 6 weeks of last chemo → +ve → 2<sup>nd</sup> line chemo
- Mass >3 cm → FDG – PET(after min 6 weeks of last chemo → Negative → surveillance
- Mass < 3 cm → chances of viable malignancy 0-4% → surveillance

**Q: After completion of 3 cycles of BEP, at what time will you do PET –CT?**

A: After 6 wks (minimum) after completion of chemotherapy, so that desmoplastic Rn & inflammation settles down

**Q: How many pts will have relapse / recurrence after induction chemotherapy for CS-II?**

A: 20 % will have relapse; 5 yr survival is 50%

**Q: what other Ix can help at this stage?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A: serum markers, Biopsy of mass if markers are normal

**Q: what will you do for such patients having relapse / recurrence after induction chemotherapy for CS-II?**

A: 2<sup>nd</sup> line chemo (if  $\beta$ -HCG is raised) -- Vi IP  $\rightarrow$  Vinblastin Ifosfamide Cisplatin

VIP  $\rightarrow$  V-Etoposide (vp-16) Ifosfamide Cisplatin

**Q: what are the Ind<sup>n</sup> for doing Post chemo residual mass resection?**

A:

- failure of 2<sup>nd</sup> line chemo,
- Teratoma on Biopsy,
- If  $\beta$ -HCG is normal then a tissue biopsy is recommended before 2<sup>nd</sup> line chemo Rx

**Q: When / at what time will you do Post chemo residual mass resection Sx?**

A; within 4-6 weeks of chemotherapy completion

**Q: When will you suspect Brain Mets?**

A: Chorio carcinoma @ Ox Biopsy or multiple lung mets in CT chest

$\beta$ - HCG > 50,000

Or Neurological Symptoms

**Q: which is having poor prognosis – Brain mets at presentation or - Brain mets after or during Rx?**

A; Brain mets after or during Rx

**Q: how will you Treat Brain Mets?**

A: BEP x 4  $\rightarrow$  Residual Mass –Resectable -Sx

Unresectable  $\rightarrow$  Rad<sup>n</sup> Rx  $\rightarrow$  cyber knife IMRT

**Q: What are the treatment related side effects of RPLND, chemo Rx and Rad<sup>n</sup> Rx?**

A:

RPLND:

- Midline scar
- Ejaculatory Dysf<sup>n</sup>
- Bowel obst<sup>n</sup>
- Peri-operative morbidity / mortality

Chemotherapy

- Myelo-suppression
- Neutropenia
- Thrombocytopenia
- Hair loss ,
- renal Dysf<sup>n</sup>

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Azoospermia
- Peripheral neuropathy

Rad<sup>n</sup> Rx

- Azoospermia
- GI toxicity, G.U. toxicity
- Leucopenia, dyspepsia

Late

- Hypogonadism
- Infertility
- secondary malignancies
- Cardiovascular Toxicities

**Q: What tumour can secondarily involve Testis?**

A:

1. Lymphoma
2. Leukemia
3. Metastasis

**Q: what is pts age in testicular lymphoma?**

A: usually > 60 yrs

**Q: which type of lymphoma it is?**

A; NHL

**Q: what is type a & type b lymphoma?**

A: Type a : Asymptomatic

Type b : symptomatic – fever, night sweat wt loss

**Q: how will you Mx lymphoma?**

A: Ox + R-CHOP – Rituximab, Cyclophosphamide, H- Doxorubicin, O-Vincristine (Oncovin), P-Prednisolone

**Q: What are the pt characteristics of leukemic infiltrations?**

A: Young Boys,  
Frequently Bilateral

**Q: How can you diagnosis Leukemia?**

B: Biopsy

**Q: How will you Mx leukemic secondaries in testis?**

A; 20 Gy Radiotherapy; including contralateral testis also

**Q: What organs can send mets to testis?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A: Prostate, lung, melanoma, kidney, colon

**Q: What are the clinical characteristics of secondary mets?**

A: late stage disease, bilateral

**Q: How will you do Mx of mets to Testis?**

A:- Mx of primary tumour and palliative orchidectomy

**Q: Name some non-germ cell tumours?**

A: Leydig cell ca, sertoli cell, Granulosa cell ca

**Q: What are the clinical characteristics of non GCTs?**

A: Gynecomastia +,

Bilaterality -ve, Cryptorchidism -ve

→ Orchidectomy is sufficient

→ RPLND if required, (chemo / Rad<sup>n</sup> – no use)

**Q: What are testicular adnexa?**

A: Tunica vaginalis; vas; epididymis, spermatic cord, cremasteric muscle

**Q: what are the adnexal tumours?**

A: arising from adnexa - Epididymis, - Tunica vaginalis, Cremasteric muscle

**Q: Name few adnexal Tumours?**

A: Cystadenoma of epididymis

Mesothelioma of t. Vaginalis

Rhabdomyosarcoma of cremasteric

Liposarcoma

Fibro sarcoma

**Q: What is AJCC Staging of Ca testis?**

Tx

T1s – ITGCN ca in situ

T1- Tumour limited to testis and epididymis → LVI-, → TV-

T2- tumour limited to testis and epididymis → LVI+, TV+

T3 – Tumour invade the spermatic cord with LVI

T4-Tumour invade the scrotum +/- LVI

Nx, No

N1 → < 2cm, N2 → 2-5cm, N3 → > 5cm, lymphnode mass

Mx, Mo

M1- M1a – non regional nodal or pulmonary

## **Neeraj Sharma's ...Notes For Urology Practicals**

M1b – Non pulmonary ,			
Sx, So	AFP	HCG	LDH
S1	< 1000ng/ml	< 5000 IV/ml	1.5 Times normal
S2	1000- 10,000ng/ml	5000-50000	1.5-10 times normal
S3	>10,000	>50000	>10 times normal

Ca testis does not have Stage IV

---

### **RPLND**

**Q: who described lymphatic drainage of Testis?**

A; Most

**Q: who described landing sites for Right & left Ca testis?**

A: Donohue

**Q: What are testis drainage nodal sites?**

For right- para caval, inter aorta caval, Pre caval

For left - para aortic, pre aortic, inter aorta caval

**Q: what does iliac L.N. enlargements suggest?**

A: Retro grade flow, Bulky disease, aberrant drainage of testis

**Q: with which sided testicular tumours C/L spread is more common?**

A; right side testicular tumours

**Q: what is the drainage area of epididymis & scrotum?**

A: Epididymis – Ext. iliac group

Scrotum - Inguinal L.N.

**Q: when will you do renal hilar dissection?**

A; Post chemotherapy mass at hilar / suprahilar region

**Q: what is the most common site of supra hilar region involvements?**

A: Retro crural space

**Q: what is the most common side effect of RPLND?**

A; Loss of antegrade ejaculation --.Potential infertility

**Q: why there is Loss of antegrade ejaculation after RPLND?**

A: Due to Damage to sympathetic nerves which control bladder neck

**Q: What are nerve roots of these sympathetic nerves which control bladder neck?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A; T12- L4

**Q: Who described modified template?**

A: Narayanan

**Q: On which side tumour, the prevention of ejaculation is better?**

A: right side

**Q: What are the Boundaries of modified RPLND?**

A: ipsilateral – from renal vessels to bifurcation of iliac vessel

Contra lateral – from renal vessels to IMA

Limited by lateral borders – Ureters

**Q: What is the dis adv modified RPLND?**

A: 20% pts have extra-template disease

**Q: where is Hypogastric plexus?**

A: In & around I.M.A, just above the Bifurcation of aorta

**Q: Which nerve roots are responsible for seminal emission and ejaculation?**

A: - Seminal Emission ; T12 – L3

- Seminal ejaculation : S2, S3, S4

**Q: what are the approaches to RPLND?**

A: Thoraco – abdominal (cooper) → Suprahilar LND, → Thoracic involvement

Trans abdominal

**Q: Where will you open post peritoneal leaf?**

A: medical to IMV

Extent upward to DJ J<sup>n</sup> (ligament of TREITZ)

Down to I.C J<sub>n</sub>

**Q: What is the proper plane of dissection?**

A: B/W IMV (laterally) & left Gonadal vein (medially)

**Q: what are Indn for nerve sparing RPLND?**

A: sexually active male

NSGCT I, IIA, IIB

Highly selective II<sub>c</sub> & PC Sx

**Q: What nerves you want to preserve during RPLND?**

A: sympathetic nerve T12 – L4

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q; what are the components of nerve sparing RPLND?**

A

1. Splitting @ ant wall of IVC
2. Don't dissect below & around IMA
3. Leave Hypogastric & pelvic plexus intact
4. Prospective identification & dissection of nerves

**Q: What are the results of nerve sparing RPLND?**

A; anti grade ejaculations preserved in 90% of people If well performed RPLND

**Q: What % of people have Retro aortic left renal vein?**

A: 1-3%

**Q: Does C.T abd over stages or understages the disease?**

A: C.T. Under stages the retroperitoneal spread

---

### **Miscellaneous**

**Q: What is Markers only disease?**

A: post Ox, CECT (Abd, chest & Pelvis) = negative but serum tumour markers are Raised

**Q: what will you do for markers only disease?**

A: cisplatin based chemo Rx

- |                        |                    |
|------------------------|--------------------|
| BEP X 2 cycles         | if Ox s/o NSGCT    |
| Carboplatin x 2 cycles | if Ox s/o Seminoma |

**Q: What will you do if there is a residual mass & raised markers after induction chemo Rx?**

A: s/o viable GCT in mass and a 2<sup>nd</sup> line chemo is recommended espl. in seminoma

**Q: Teratoma is benign, so what is your worry?**

A:

1. It can grow, obstruct or invade the adjacent structure
2. Malignant transformation to sarcoma
3. Re-grow if incompletely resected
4. Chemo resistant & radio resistant

**Q: What are the std/usual Recommendations for post chemo residual mass (in NSGCT)?**

A: RPLND if mass >1cm



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q; What is the most common site of recurrence after RPLND and why?**

A: left para-aorta region

- Increased technical demand in original Operation at this site
- Requirement of mobilization of pancreas & dissection of renal vessels

**Q; what are the complications of RPLND?**

A; Neurological –	Femoral / brachial neuropraxia, Spinal Cord ischemia
Fertility	Loss of antegrade ejaculation
Vascular complications	Injury to great vessels
Pulmonary compl <sup>n</sup>	Atelactasis, ARAS, Pneumonia
G I compl <sup>n</sup>	ileus, injury, ischemia
Lymphatic compl <sup>n</sup>	chylous ascitis, RPF

**Q: what are the prognostic factors for seminoma NSGCT metastatic disease?**

A; Seminoma	→ size of primary > 4cm, rete testis involvement	} Bad prognosis
NSGCT	→ LVI +ve, EC >50% (Embryonal cell component	
Metastatic Disease	→ Site of primary (mediastinal), Markers status (S3), Non pulm, non visceral mets	

---

**Let's revise**

**Ca-Testis**

Age (in years)	Type of germ cell tumour
20-30	NSGCT
30-40	Seminoma
50-60	Lymphoma
70-80	spermatocytic seminoma

Risk factor : crypto O<sub>x</sub>, family H/O, personal, ITGCN, Microlithiasis

Condition a/w ca-testis – Hypospadias, cryto-orchis, Ambiguous genitalia

**Who Classification of Ca Testis**

Germ cell tumour

Non GCT → Stromal , → Tumour of supporting structures-Tunica,-Epididymis, spermatic cord

Lymphoid, Hemopietic

Seminoma marker , CD-117

Teratoma – Mature, immature

Growing Teratoma syndrome, theories

Gynecomastia, pulm-mets, RPLN mass

D/D of scrotal; swelling

**AFP**

0-10 mg /ml

5-6 days

Hepato cellular ca

GI cancers stomach

Ca pancreas, ca lung

Hepatitis -alcohol

-drug, auto immune,

Gastritis, pancreatitis

Pneumonia

**BCG**

0-5 ml.U /ml

24-36 hr

cross reactivity with FSH / LH

Marijuana use

Smokers

## Neeraj Sharma's ...Notes For Urology Practicals

### Pancreatic & Billiary Ca

LDH  
24 hr Hemolysis, Rhabdomyolysis, MI

Shivasu Maneoure

Scrotal violation 0.3 % to 3.0%

Biopsy of C/lateral Testis; - atrophic  
- H/O UDT  
- Decreased Sperm counts  
- Suspicious lesion

Post op marker  
Post op CECT - Post op staging

NSGCT CS-I	low risk – 20%
LVI+/-	Int risk 40%
EC+/-	High Risk - 60%

Only ITGCN

Spermatocytic Seminoma

Bleomycin – Pneumonitis, Pulmonary fibrosis, Pulmonary edema

Etopside (VF-16) – BMS, N.V.D, Alopecia

Cisplatin – Nephrotoxicity, Ototoxicity, Peripheral neuropathy

BEP-312 ,

BEP x 2, BEPx3, BEPx4

B.S.S = Du. Bois formula = square root of (Ht cm X Wt mg / 3600)

IGCCCG – prognosis → BEPx3, BEP-4

VIP = VP-16 (Etopside)

Ifosfamide

Cis-platin

Post chemo mass – 40% = Teratoma, -- 40%=fibrosis, -- 20% = viable tumour

Radiotherapy – side effects- GIT, GUT, sexual, 2<sup>nd</sup> cancer

Fl/up

## **Neeraj Sharma's ...Notes For Urology Practicals**

NSGCT – I  
NSGCT-II, III

PTCC 4422  
PTCC 4442

### **Seminoma**

Risk Factors = size of primary > 4 cm  
Rate testis involved

Chances of nodal mets in CS-I seminoma  
Low risk -5  
High risk 15%

Traditional Radiation EBRT – Dog leg radiotherapy → fossa et al

Currently → Para –aortic + Ipsilateral iliac  
FDG- PET on seminoma for mass > 3 cm  
Post chemo (CS IIB)

2<sup>nd</sup> line chemo for seminoma – Vi IP,. VIP

### **Secondaries to Testis**

- Lymphoma
- Leukemia
- Prostate, kidney, lung

### **Melanoma**

### **Non Germ cell tumours**

- Leydig cell Ca
- Sertoli cell Ca
- Granulosa cell Ca

### **Adnexal Tumours**

- Cysto Adenoma of epididymis
- Mesothelioma (T.Vaginalis)
- Rhabdomyosarcoma (cremaster)
- Liposarcoma
- Fibrosarcoma

Lymphatic drainage if Testis → most & Donohue  
Modified Template → Narayanana

## **Neeraj Sharma's ...Notes For Urology Practicals**

Boundaries of modified RPLND

Hypogastric plexus

Seminal emission T<sub>12</sub>-L<sub>2</sub>, ejaculation S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub>

Posterior peritoneal leaf → between IMV (laterally) & Gonadal Vein (medially)

Pediatric Ca Testis

- Teratoma
- York sac Tumour
- Epidermoid Cyst

C.O.G – Staging for pediatric tumour –Teratoma, - YST

I- Tumour confined to testis – margin –ve, marker –ve → post Ox

II- Microscopic Residual + / Marker + post Ox/ scrotal violation

III- Retro peritoneal ins

Node 0-2, 2-4, 4-infinitive → cm

IV- Mets

Gonzalez- Crussi grading system for Teratoma

Chemo Rx for Pediatric Ca Testis – BEPx4

Bleomycin

(Test dose is must)

Day 1,8,15

30mg/m<sup>2</sup>

Anaphylaxis

Pneumonitis, pulm fibrosis,

Etoposide

100mg/m<sup>2</sup>

Day 1-5 @ 21 days

BMD M/V/D/F

Cardiac Toxicity

Hypotension, electrolyte imbalance

Cis Platin

30mg /m<sup>2</sup> day 1-5 @ 21 days

+mgso<sub>4</sub>

Nephro& neuro toxicity

Hypomagnesaemia

Fl/up protocol – PTCC

Testicular Blood supply

- Testicular Art – branch of aorta
- Vas def artery – branch of superior vesical artery
- Ext. spermatic Art- branch of inferior epigastric artery

Venous plexus: Pampiniform

Nerves : Ilio Inguinal N/ Genital Branch of GFN

**Orchitis**

Acute Infections- Bacterial

## **Neeraj Sharma's ...Notes For Urology Practicals**

Non Bacterial – Viral, - Fungal, - Parasitic

Acute Non infn - Idiopathic / Traumatic / Auto immune

Chr. Infection – Myco TB, Bacterial

Chr. Non infn – Orchalgia

---

### **Clinical case    Ca-Testis**

Post chemotherapy – residual mass

19 yr/m   h/o right Orchidectomy for Testicular mass 2 years back (December 2010)

Ox-HPE<sub>x</sub><sup>m</sup> report s/o → NSGCT with teratoma

Presented with 10x10 cm RPLN mass + pulm. Mets (April 2012)



Markers S3,    4 cycles of E.P. given (Bleomycin not given )

9x9 cm mass + S1 markers (AFP raised)...August 2012



What to do now?

**Q: What is this case look like?**

A: K/C/O- NSGCT with post chemo residual mass

**Q: How will you proceed?**

A:

1. Get basic Ix- CBC, RFTs, sr. Tumour markers
2. CECT Abd with CECT chest (Re stage & Re-evaluate the tumour)

**Q: Mass is now 9x9 cm, S1 –markers: now what?**

A; As markers levels are sill high I will give 2<sup>nd</sup> line chemo – EP x 2 or VIP x 3 cycles

**Q: what is the traditional indication for Post chemo—RPLND?**

A: Residual mass with normal markers

**Q: How many pts undergoing RPLND will have adjunctive Sx (like splenectomy/nephrectomy)**

A: 20% - 30%

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: can there be any discordance b/w histology of retroperitoneal mass & pulm mets.?**

A: Yes, upto 30%, even bilateral thoracotomies can have different histology reports.

**Q: when will you do C.T scan post chemo Rx?**

A: after 14 days (to let the infl<sup>m</sup> subside)

**Q: While doing P.C--Sx what is the timing of Sx?**

A; post chemo RPLND should be done

- within 4-6 wks of completion of chemotherapy
- Or within 10 days of last done C.T.scan
- Or within 7 days of last done markers

**Q: How will you fl/up a pt of PC Sx?**

A;

(PTCC)	1-2 yrs	3-5 yrs	5 yrs
P Phy.Exam <sup>n</sup>	6 monthly	6 monthly	12 monthly
T Tumour markers	6 monthly	6 monthly	12 monthly
CXR	6 monthly	6 monthly	12 monthly
CT abd chest	6 monthly	6 monthly	Sos

---

### **EAU guidelines 2012**

**Q: Other than serum testicular markers, what specific lab Ix do you want to do?**

A;

- Serum Testosterone,
- LH, FSH
- Semen analysis

**Q: A CS-I (seminoma) Pt who was on surveillance develops RPLN mass. How will you Mx?**

A:

1. Serum markers
2. Size of RPLN mass →  $\leq 3\text{cm}$  → radiotherapy → (still recur)chemo

↘  
 $\geq 3\text{cm}$  → chemo

**Q: what is the Break through change in Mx of CS-I ?**

A: Previously CS-I (node negative) high risk patient dog leg radiotherapy was given (preferred over chemo; due to ease of fl/up) but **EAU -2011** states that Radiotherapy is not recommended instead give one cycle carboplatin to high risk patients.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the guideline statement for Mx of NSGCT-CS-I?**

A: NSGCT-CS-I


- Low risk (no LVI ) → surveillance
- High risk (LVI +ve) → BEP x 2
- Marker only Disease → BEP x 2

**Q: What are the guideline statements for Mx of NSGCT –IIA/ IIB?**

A: according to EAU – 2011

-1<sup>st</sup> line BEP (espl. If marker +ve) (even for markers –ve)

Post BEP CECT, fl/up 6 wks → Lesion → shrinking→ fl/up

Post BEP CECT, fl/up 6 wks → Lesion → Growing 

- Markers –ve → RPLND (Teratoma suspected)
- Marker +ve → BEPx2

**Q: what are the guideline statements for chemotherapy in CS II, NSGCT- II?**

A: Classify / stratify according to IGCCCG pronostification group

- good prognosis = BEP x 3 (@21 days cycles)
- Intermediate prognosis = BEP x 4
- Poor Prognosis = BEP x 4

**Q: what will you see before giving next chemo BEP cycle?**

A) WBC >1000, Platelet > 1, 00,000, PFTs, RFTs, Tumour markers

**Q: When will you give dose intensified BEP?**

A: Primary in Mediastinum, synchronous brain mets

**Q: What chemo will you give if there is extensive lung infiltration?**

A: EP X 4, Bleomycin cannot be given.

**Q: How does it matter, Seminoma or NSGCT as primary in Ox ?**

A: For seminoma

1. Teratoma in residual mass is not an issue
2. PC Sx is not feasible in seminoma primary due to very high desmoplastic Rn

**Q: what is general agreement for this mass ?**

A; Conservation Mx if mass < 3 cm

**Q: what should be done for mass > 3cm?**

A: FDG – PET



## **Neeraj Sharma's ...Notes For Urology Practicals**

Biopsy → +ve → 2<sup>nd</sup> line chemo  
-ve → . Leave if alone

---

### ***Pediatric Ca testis***

8 yr/m present with complaints of right side scrotal swelling / noticed by parents / during bathing / painless / no other complaints

**Q: what else you want to know ?**

A:

- Past medical h/o- Leukemia, lymphoma
- Past Sx – Orchidopexy, torsion, scrotal Sx
- Birth H/o – undescended Testis, maternal exposure to estrogen, IVF
- H/O trauma

**Q: What else you want to know?**

A: local Examination

- Scrotum, testis, penis, abd, spine
- Get above the swelling, fluctuation, transillumination

Gen exam – Weight, well being , Height

**Q: what is your D/D for painless scrotal swelling?**

- Ca testis
- Hernia (reducible)
- Hydrocele (Transillumination +ve)
- Hematocele
- Chronic Epididymitis
- Epididymal cyst
- Spermatocele (adults)
- Varicocele (adults)

**Q: what will you do next?**

A: USG scrotum abd (color Doppler)

**Q: What are features of benign testicular disease on scrotal USG?**

A: finding of cystic lesions

- Simple cyst

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Cystic dysplasia
- Teratoma
- Cystic Granuloma

### **Q: What are the features of malignant testicular disease on USG?**

- A: Hypo echoic –Homogenous mass(seminoma)
- Heterogeneous mass(NSGCT)

### **Q: What will you do next?**

A: Tumour markers –espl. AFP

AFP – Produced by fetal yolk sac ( $T_{1/2}$  – 5 days)

- All YST produce AFP
- All AFP raised tumours contain YST elements
- Normal AFP means → Teratoma / Benign mass, Seminoma, Choriocarcinoma

### **Q: What about Beta HCG in pediatric Ca testis?**

A: not raised in Pre adolescent tumours

### **Q: What is COG-staging of pediatric testicular tumours?**

A: COG-staging is POST ORCHIDECTOMY STAGING

Stage I → Tumour confined to testis

- Margin –ve (neg) after Ox
- Markers –ve after Ox

Stage II → Microscopic residual

- markers +ve post Ox
- Prior scrotal violation

Stage III → Retroperitoneal L.N. involvement

- Node > 4 cm (consider +ve unless proved otherwise)
- Node < 2cm (consider –ve unless proved otherwise)
- Node 2-4 cm (consider biopsy)

Stage IV → Distant mets

### **Q: what will you do for child with testicular mass?**

A: High ing Ox & then Biopsy report

### **Q: when will you suspect teratoma (in testis)?**

A:

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Usg appearance – complex hypo echoic mass surrounded by hyper echoic signal (Krone –Carroll sign)
- Normal markers
- 40% of pediatric testicular tumours are teratoma

### **Q: How will you manage Teratoma?**

A: Schivasu's Maneuver + partial Ox (testis sparing Sx) + Biopsy (frozen section)

### **Q: What is mature & immature teratoma?**

A; Mature Teratoma: Well Encapsulated

Multiple cysts on cut section

- Contains mature tissues

### **Q; what is Gonzale – crussi grading system for teratoma?**

A;

G-0 – mature, benign

G-1 – immature, probably benign

G-2-- immature, possible malignant

G-3 – immature, frankly malignant

### **Q: what if USG s/o homogenous / heterogeneous mass with no cysts, but markers raised?**

A: YST (yolk sac tumours)

- YST is the 2<sup>nd</sup> most common pediatric testicular tumour

### **Q: what is the stage wise Mx of YST?**

A:

#### **Stage I (Tumour confined to testis)**

- Ox is complete cure
- stringent Fl/up

#### **Stage II (Microscopic +ve or H/O previous biopsy)**

- Do high ing Ox → marker neg → fl/up  
                                    ↘ Markers +ve → chemo

#### **Stage III (RPLN +ve)**

- Ox + chemo (BEP x 4)

#### **Stage IV**

- Chemo + Ox

### **Q: What will you do for post chemo mass?**

A: Post chemo mass or Rising Markers → Biopsy → resect RP lymph nodes

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What other scrotal tumours can be identified on USG?**

A; Epidermoid Cysts

- Heterogeneous intra testicular mass with concentric rings of alternating hypo - & hyper –echoic layers. That give rise to an “ onion –skin appearance”

### **Q: What is onion skin tumour?**


A: Epidermoid cyst (15%)

### **Q: How will you manage?**

A: Testis sparing approach ( Benign Disease) (Schivasu's Opn.)

### **Q: What other malignancies can be present in testis?**

A; Leydig cell ca  
Sertoli cell ca  
Granulosa cell ca



sex chord tumours

Leydig cell Ca

- Most common of sex cord tumours
- Reach age 4-5 yr
- Produce testosterone, steroids, oestrogens
- Leads to Gynecomastia
- Leads to Precocious puberty

### **Q: what are the causes of Precocious Puberty?**

A:

- Pituitary Lesions (↑FSH, ↑LH)
- Leydig cell hyperplasia (increased urinary 17 ketosteroids)
- Sertoli cell ca
- Congenital adrenal hyperplasia (raised urinary ketosteroids)

### **Q: How will you manage Leydig cell tumour?**

A: Orchidectomy (Ox)

### **Q: What is Gonadoblastoma?**

A:

- Tumour associated with DSD
- Malignant Transformation
- Due to active 'Y' gene
- Mx – all gonads should be removed

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What hematological condition can metastasize to testis?**

A: Leukemia (all)  
Lymphoma (NHL)

**Q: How will you suspect and investigate a case of testicular mass suspected for NHL?**

A: On gen Ex<sup>m</sup> – Multiple L.N.

-HepatoSpleenomegaly

Symptom – fever / malaise / bone markers

Sign: Anemia

Ix: - blood Ix, Blood smear/ Bone smear/Testicular biopsy

Mx: Medical chemotherapy CHOP –

- Cyclophosphamide
- Doxorubicin
- Oncovin
- Prednisone

**Q: what is telium Tumour?**

A; YST is also called Telium tumour

---

### ***miscellaneous***

**Q: What is “Ram’s Horn” penis?**

A: Lymphodema & thickness of skin & subcutaneous tissues of penis

**Q: How will you differentiate syphilitic ulcer scrotum from TB ulcer?**

A: Syphilitic ulcer is present on ant scrotal wall, whereas T.B ulcer is present on post scrotal wall

**Q: What is Testicular Sensation?**

A; Sickening Sensation felt by pt when mild pressure is applied over testis

**Q: What are D/ds of Loss of testicular Sensation?**

A:

1. Gumma (syphilis) of testis
2. Ca testis
3. Mumps

**Q: what is the cause of Posterior scrotal sinus?**

A: T.B

**Q: How will you clinically differentiate b/w TB, Syphilis and filariasis ?**

A: TB

- Effects epididymis first
- Beaded vas
- Affects spermatic cord also
- Post scrotal sinuses

## **Neeraj Sharma's ...Notes For Urology Practicals**

### Syphilis

- Effects testis first
- Ant scrotal sinus
- Does not effect cord

### Filariasis

1. Simultaneous involvement of Both testis epididymis
2. Cord effected → lymph varies

### **Q: what is the urological importance of ascheim zondek test?**

A: basically a pregnancy test based on HCG detection in urine of the patient.(Also known as rabbit test) when urine of pregnant woman is injected in to rabbit, the ovaries of rabbit folliculates.

Test is also +ve in sertoli cell tumours & Choriocarcinoma.

### **Q: What is the difference b/w hydrocele of ca testis & primary hydrocele?**

A; Primary Hydrocele: amber color fluid, clear fluid

Specific gravity 1.022 – 1.024, contains water, cholesterol, fibrinogen, albumin,

Ca. testis hydrocele – blood stained fluid,- enlarged testis, high specific Gravity

### **Q: what are the other staging systems for Ca testis?**

A:

1. Skinner system
2. Walter reed system
3. Boden gibb system

---

## **Testicular Tumour**

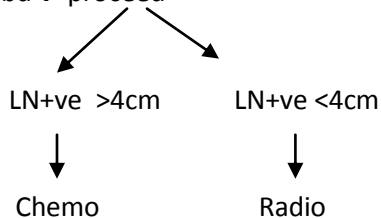
37 yr/m H/o inguinal Ox 5 yr back

HP Ex-seminoma, pT-3, Tumour Marker normal ,lost to fl/up

Now presented with back pain

### **Q: What is the ideal Mx of pT-3 seminoma?**

A: CECT abd → proceed



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Can pT-3 patients have normal markers?**

A; pT3 proven seminoma can have normal markers

**Q; what are the markers of seminoma?**

A: normal AFP

**Q: What does Increase LDH depict?**

A: Bulky / massive disease

**Q: How will you proceed?**

A: serum markers, CECT abd, CXR-PA

B'coz of back pain - x ray-L.S Spine

**Q: What are types of seminoma?**

A:

- Classical
- Spermatocytic
- Anaplastic

Stage for stage anaplastic seminoma is equal to classic seminoma

---

### **CECT S/o Bulky retroperitoneal mass- stage N-2**

**Q; When will desmoplastic reaction occur in seminoma?**

A: after chemotherapy

**Q: what is ideal treatment for N-2 disease?**

A: chemo BEPx3 of BEPx4

**Q: Will you do biopsy of RPLN mass?**

A: No need; it is a proven case of seminoma & LDH is raised

**Q: How will you monitor the pt on chemo?**

A; follow on the markers levels,

CECT for regression of mass

**Q: What chemotherapy would you give?**

A: 4 cycles BEP

After 4 cycles Chemo to N-2 patient → AFP ↑↑, LDH↑

**Q: What does ↑ AFP indicate now?**

A: element of NSGCT

Mature Teratoma

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What does ↑ LDH depict?**

A: Tumour *not responding* to chemo Rx

**Q: How will you proceed now?**

A: Repeat CECT after 4 cycles of BEP

**Q: what can be done if repeat CECT shows Partial Response ?**

A: 2<sup>nd</sup> line chemo / PET scan

**Q: What is the Mx of PET (negative) RPLN mass?**

A

- Mass can spontaneously disappear 50-60% @ 18 months
- Viable cancer 10-30%
- Success of salvage chemo is low
- RPLND surgery is difficult, due to desmoplastic Rn.

PET CT can be active in TB also

**Q: What can be the HPE<sub>x</sub><sup>m</sup> finding on PC S<sub>x</sub> in seminoma?**

A: Necrosis - 90%

Viable - 10%

**Q: How difficult can be the seminoma PCS<sub>x</sub>?**

A: very difficult

- Additional Nx may be required
- Partial /complete resection of IVC may be Required
- Placement of Aortic Prosthesis may be needed
- (all these may be required in 38% of PC Sx for seminoma)

**Q: what are the EAU guidelines for Mx of Cs-II seminoma?**

A: seminoma IIA: Radiotherapy

Seminoma IIB: Chemo of mass >3 cm, BEP x 3

: Radiotherapy of mass < 3 cm

**Q: How will you monitor tumour (RPLN) on a pt on BEPx3 for NSGCT-Cs-II?**

A: do serum markers before every cycle, if there is documented markers increase after 2 courses of BEP, an early crossover of therapy is indicated

For marker decline but growing RPLN mass → do RPLND in suspect of Teratoma



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the guideline statement on FDG-PET for seminoma RPLN IIA/IIB/IIC PCS<sub>x</sub>?**

A: FDG-PET should be done for PCS > 3cm seminoma

FDG –PET has high negative predictive value

FDG –PET should not be done less than 2 months after chemotherapy

**Q: what is the guideline statement for Mx of PC mass seminoma?**

A:

- Do not resect (irrespective of size)
- Do Beta HCG before 2<sup>nd</sup> line chemotherapy
  - If beta HCG is raised → give 2<sup>nd</sup> line chemo
  - If beta HCG is normal → tissue biopsy is recommended
- 2<sup>nd</sup> line chemotherapy (VIP/VeIP)
- If 2<sup>nd</sup> line fails → then Surgery

**Q: What is the guideline statement for Mx of NSGCT post chemo-mass?**

A:

- Post chemo mass (NSGCT) should always be resected if size of mass > 1 cm
- Complete RPLND is advisable
- Template RPLND is equally effective
- Lumpectomy (only tumour mass removal) is condemned

**Q: In case of Post chemo mass; will different organs involved show same histological subtype?**

A: No, not necessary, some may show only necrosis and other may show teratoma on viable tumour.

Same organ with two masses –will usually show same histological type



***Neeraj Sharma's-***

***NOTES FOR UROLOGY PRACTICALS***

# ***GUTB***

## **GUTB                      INCIDENCE PATHOLOGY AND GENERAL**

**Q: Who coined the Term GUTB?**

A: Wild – Bolz

**Q: What is the incidence of Tb and GUTB?**

A; Incidence of TB 200/ million,

Incidence of GuTB= 4% - 5% of TB cases

In India the estimate of TB is 168/100,000 population/year (WHO 2005 estimates) with an annual incidence of 2.2 million/year (worldwide six million new cases) and an annual death rate of 29/100,000 population/year.( IJU-2008)

**Q: Which female genital organs are commonly involved in GUTB?**

A: Fallopian Tube 100%, endometrium 60%, Ovaries 30%

**Q: Which male genital organs are commonly involved in GUTB?**

A: 1. Epididymis

2. VAS

3. Seminal Vesicles

4. Prostate

**Q: What is the Indian age for TB?**

A: 25-50 yr for GUTB,

**Q: What % of TB pts are HIV +ve?**

A: 10-15% Indian pts with TB have HIV

**Q: What % of Transplant pts will have TB?**

A: 10-15% of post Tx pts have TB

-Disseminated form of TB occurs in Transplant pts

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What % of TB is extra pulm?**

A: 10% TB cases are extra pulm (double for developing countries)  
40% of these 10% will be GUTB (4% of total TB = GUTB)

**Q: What is the m/c type of extra pulm. TB?**

A: Lymphnodal fl/by bone and joints fl/by GUTB

**Q: Which vitamin deficiency causes TB?**

A: Vit-D receptors are present in T-cell, beta cells and toll cell receptors. Deficiency of Vit-D causes ↓↓ immunity

**Q: When is world TB day?**

A: 24th march (Mycobacterium was discovered on 24th march) by Robert Koch

**Q: What is the type of infn / Transmission / Latent period for pulm TB?**

A:

- Airborne
- Latent period 12 weeks
- Primary infn site: upper zones of lung

**Q: What is the lag period b/w pulm TB and GUTB?**

A: GUTB occurs after 10-15 yrs of pulm TB  
M. Tuberculosis 90% (source of Infn is Respiratory Tract)  
m. Bovis (10%) (Source of Infn is G.I. Tract)

**Q: What is the source of GUTB?**

A: Dissemination from primary pulmonary TB via hematogenous spread → dormant loci → re-activation  
→ GUTB

**Q: What are types of Mycobacteria?**

A:

- Mycobacteria causing TB (M.T.B)
- Mycobacteria causing leprosy (M.L)
- Atypical mycobacteria = non tubercular mycobacteria (NTM)

**Q: Give examples of MTB?**

A:

- Mycobacterium Tuberculosis
- Mycobacterium Bovis
- Mycobacterium Africanum
- M. Microfti

## **Neeraj Sharma's ...Notes For Urology Practicals**

- M. Canetti

### **Q: What are atypical Mycobacteria?**

A: Those Mycobacteria which do not cause T.B or Hansen's disease

### **Q: How are atypical Mycobacteria classified?**

A: In 1959, botanist Ernest Runyon put human disease-associated bacteria into four groups (Runyon classification)

- Photochromogens, which develop pigments in or after being exposed to light. Examples include *M. kansasii*, *M. simiae* and *M. marinum*.
- Scotochromogens, which become pigmented in darkness. Examples include *M. scrofulaceum* and *M. szulgai*.
- Non-chromogens, which includes a group of prevalent opportunistic pathogens called *M. avium* complex (MAC). Other examples are *M. ulcerans*, *M. xenopi*, *M. malmoense*, *M. terrae*, *M. haemophilum* and *M. genavense*.
- Rapid growers include four well recognized pathogenic rapidly growing non-chromogenic species: *M. chelonae*, *M. abscessus*, *M. fortuitum* and *M. peregrinum*. Other examples cause disease rarely, such as *M. smegmatis* and *M. flavescens*.

### **Q: What are the types of Atypical Mycobacteria?**

A: Runyon Classification

1. Photo chromogens – which develop pigmentation after being to light - *m.Kansasii* , *M. Marinum*
2. Scoto chromogens: Which develop pigments in darkness -*m. scrofulaceum*
3. Non chromogens→ MAC (*m. Avium* complex)
4. Rapid Growers → *m. Abscessus*, *m. Fortuitum*

### **Q: What are the types of mycobacteria TB as per growth rates?**

A:

- Rapid growers → INH
- Intermittent spurts : Pyrizinamide
- Slow growers ←→ Rifampicin
- Dormant → no drugs

### **Q: What is mode of spread to GUTB?**

A: Hematogenous (medlar's hypothesis)

### **Q: What is Medlar's hypothesis?**

A: in 1949 Medlar first proposed a hypothesis regarding involvement of genitor-urinary system in T.B. patients. The salient features of this hypothesis were...

- The individuals who develop GUTB have impaired immunity in general
- Kidney is the most common organ involved ,followed by prostate
- It takes usually more than a decade for GUTB to occur after primary pulmonary T.B.

## **Neeraj Sharma's ...Notes For Urology Practicals**

- GUTB is a result of hematogenous spread

### **Q: What is Walgreen time table for TB?**

A: Manifestation of TB in children can be predicted based on the Walgreen Timetable highlighted below:

- Pulmonary tuberculosis – within a few months of primary infection.
- Miliary and meningeal tuberculosis – 2-6 months.
- TB adenitis - 3-9 months.
- Bones and joints – several years.
- Renal and genital tuberculosis – may take over a decade.
- Reactivation of a dormant focus previously established in the body takes a number of years after primary infection.

### **Q: What are the typical inflammatory cells seen in GUTB?**

A: large mononuclear cells

Lymphocytes

Epitheloid cells = Langhan cells

### **Q: What is pathological lesion in TB known as?**

A: Granuloma

### **Q: What is granuloma / Tubercle?**

A: abscess and bacilli in centre, granulocytes, macrophages, giant Epitheloid cells around & fibroblasts forming outer most layers.

- Abscess in centre
- Bacilli with in wall of abscess
- CD 4 lymphocytes cells
- Dendritic cells
- Epitheloid cells
- Fibroblasts are outermost

A tubercle usually consists of a centre of dead cells and tissues, cheese like (caseous) in appearance, in which can be found many bacilli. This centre is surrounded by radially arranged phagocytic (scavenger) cells and a periphery containing connective tissue cells. The tubercle thus forms as a result of the body's defensive reaction to the bacilli. Individual tubercles are microscopic in size, but most of the visible manifestations of tuberculosis, from barely visible nodules to large tuberculous masses, are conglomerations of tubercles.

### **Q: What are the different PH environments in granuloma?**

A:

- Extracellular → Alkaline PH
- Intracellular → acidic Ph
- Necrosis / Caseous → Neutral / acidic

**Q: What are Langhan cells?**

A:

- Langhans giant cells (also known as Pirogov-Langhans cells) are large cells found in granulomatous conditions.
- They are formed by the fusion of epithelioid cells (macrophages), and contain nuclei arranged in a horseshoe-shaped pattern in the cell periphery.
- Although traditionally their presence was associated with tuberculosis, they are not specific for tuberculosis or even for mycobacterial disease. In fact, they are found in nearly every form of granulomatous disease, regardless of etiology.
- Langhans giant cells are named after Theodor Langhans (1839–1915), a German pathologist.
- They should not be confused with Langerhans cells, which are mononuclear epidermal dendritic cells derived (like Langhans cells) from monocytes and named after Paul Langerhans. (The Islets of Langerhans are also named after Paul Langerhans.)

**Q: What is Ghon's complex?**

A: Ghon's complex is a lesion seen in the lung that is caused by tuberculosis.

- The lesions consist of a calcified focus of infection and an associated lymph node.
- These lesions are particularly common in children and can retain viable bacteria, so are sources of long-term infection and may be involved in reactivation of the disease in later life.
- Typically, the inhaled bacilli implant in the distal airspaces of the lower part of the upper lobe or the upper part of the lower lobe, usually close to the pleura. As sensitization develops, a 1- to 1.5-cm area of gray-white inflammation with consolidation emerges, known as the ***Ghon's focus***. In most cases, the center of this focus undergoes caseous necrosis.
- Tubercle bacilli, either free or within phagocytes, drain to the regional nodes, which also often caseate.
- This combination of parenchymal lung lesion and nodal involvement is referred to as the **Ghon's complex**.
- During the first few weeks there is also lymphatic and hematogenous dissemination to other parts of the body.
- In pulmonary TB, Parenchymal involvement and regional lymphadenopathy is known as *the Ghon's complex*.

**Q: What are the subpopulations of TB bacteria in TB granuloma & what drugs act on them?**

A:

1. Continuous growing → INH > SM > RMP
2. Acid inhibiting → PZM  
Caseous Necrosis



## **Neeraj Sharma's ...Notes For Urology Practicals**

- 3. Spurtic Growth } RMP  
Slow growing }
- 4. Dormant/non-replicative → no drug effective

### **Q: What is acid inhibiting mycobacterial environment?**

A: Phagosomes & phagolysosomes have acidic environment intracellularly. This acidic environment is necessary for phagosome to digest the engulfed MTB bacteria. But MTB changes the acidic pH of phagosome thus disabling phagosome from digesting bacteria. This is called acid Inhibiting environment.

### **Q: What is the immune response type in T.B.?**

A: Delayed type Hypersensitivity cellular immunity

### **Q: What is the state of bacteria inside granuloma?**

A: Dead or dormant

### **Q: What all condn can lead to activation of dormant bacilli?**

A:

- HIV
- Transplant
- Steroids
- Malignancies
- Chemo Rx
- DM

### **Q: What happens when TB bacteria is activated?**

A: development of Granuloma to tubercles.  
Tubercles coalesce to form caseous necrosis.

### **Q: What are the primary sites of TB?**

A:

- Lung
- Ileum
- Tonsil

### **Q: What are the primary landing sites of MTB in GuTB?**

A:

1. Kidney
2. Epididymis
3. Fallopian Tube
4. Prostate may be (usually through urine)

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: How do Bacilli reach genital Tract?**

A; Hematogenous route (max)

Direct spread

Lymphatic spread

### **Q: What are Koch's criteria (1882)?**

A: Organism should be constantly associated with disease

Organism should be Isolated from diseased person

Organism inoculated should produce the same disease in a new patient

Organism can be re-isolated from inoculated animal

### **Q: What is the Time gap b/w pulm TB & GUTB?**

A: 10-15 yrs after pulm. TB (Walgreen's time table)

This is also part of Medlar Hypothesis

### **Q: What are the most common organ & route involved in GUTB?**

A:

- Kidney (cortex of the kidney)
- Hematogenous route

### **Q: What is the lodging site of Bacilli in kidney?**

A: renal Cortex (active Bacilli)

- Juxta-Glomerular Capillaries in cortex Because of ↑ blood supply & ↑↑ O<sub>2</sub> saturation

### **Q: What happens to bacteria after being lodged in cortical-Glomerular – capillaries?**

A:

- Bacteria are acted upon by multi nucleated leucocytes & macrophages.
- Macrophages engulf the bacteria
- Granuloma formation & Bacteria becomes Dormant.

### **Q: How the disease Progresses?**

A: Formation of Cortical granulomas → abscess cavities → shedding of papilla

Infundibular stricture → PUJn stricture

### **Q: When will Bacilliurea occur?**

A; late in disease (when collecting system is encroached)

- Absence of Bacilliurea does not exclude GUTB
- Presence of Bacilliurea confirms GUTB

### **Q: What are the sequels of GUTB?**

A: Renal Failure ...10%

## **Neeraj Sharma's ...Notes For Urology Practicals**

Renal HTN ... 12%

**Q: What are the causes of renal failure in GUTB?**

A:

1. Obliterative-- obliteration of end- arteries
2. Obstructive uropathy due to strictures

**Q: What are the causes of renal HTN in GUTB?**

A: Compression of segmental arteries due to parenchymal strictures

**Q: What is the male genital TB is association with renal TB?**

A: 60% of renal TB Cases involve Genitals

**Q: How does it spread from the kidney?**

A: Local extension

“Renal” cortical TB foci → Cortical Abscess → Abscess burst in PCT → Bacilli travel to PUJ, ureters

**Q: What is putty kidney?**

A:

- Tuberculous pyonephrosis with cement like lesions is called putty kidney
- Dense Homogenous ground glass like calcification in x ray

**Q: What is auto nephrectomy?**

A: the end result of renal GuTB is a calcified, destroyed, small non functioning kidney is called auto Nx

**Q: What % of pts have renal failure (B/L)?**

A: 10% of TB pts have renal failure (B/L)

**Q: What is the clinical presentation of GUTB?**

A:

1. Constitutional Symptoms:  
Fever, wt loss, anorexia
2. Obstructive symptoms : - flank pain, renal pain
3. Storage symptoms: LUTS, Pain, frequency, urgency, Nocturia
4. Other – scrotal sinus/infertility / hematuria
5. H/O – sterile pyuria

**Q: What are special findings in phy examination?**

A:

1. Gen Exm : lymph nodes
2. Abd Exm : Nothing specific
3. Scrotal Exam: Beaded vas / epididymis scrotal sinus.
4. DRE : Enlarged seminal vesicle firm prostatic nodules

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **5. Scrotum / Perineum : search for sinuses**

Tuberculous sinus is located at posterior surface of scrotum

### **Q: What is a disseminated disease?**

A: More than 1 organ Involvement

- In immune compromised pt. involvement of liver / bone marrow / Pericardium (any one) is considered as disseminated disease.

### **Q: When does renal TB become radiologically evident?**

A:

- Rupture of Papilla & Ulceration of Calyx is called fuzzy calyx.
- It is the first sign to appear on IVP

### **Q: Can adrenal be involved?**

A: yes, 6%

- Usually bilateral → leads to Addison's disease
- enlarged gland thick capsule, nodular surface with caseous necrosis in cut section involved
- decreased response to ACTH

### **Q: Is adrenal Involvement unilateral or B/L?**

A: Mostly Bilateral

### **Q: What % of TB cases involve adrenals?**

A: 6%

### **Q: Which part of ureter & what layer is involved?**

A:

- Lower ureter & VUJn is most commonly involved
- "mucosa" of the ureter ulcerated
- Lesions may extend deep to involve upto serosa

### **Q: What is the most common site in bladder?**

A: Juxta – ureteric orifices & Trigone

### **Q: Where is the first involvement of Bladder?**

A: near ureteric orifice due to urinary drainage pattern.

### **Q: What parts get involved first / contracts first?**

A; Juxta-ureteric orifice parts – involve first

Dome of Bldr – cicatrize first

Trigone / bladder neck -- Last to cicatrize (relatively spared)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Why TB ulcer has undermined edges?**

A:

- Because of submucosal Lymphatic vessel involvement
- submucosal Lymphatic vessel has maximum oxygen concentration & spread of necrosis

**Q: What is the role of biopsy in TB Bladder?**

A:

- no role rather usually contraindicated, (only 20-30% are +ve)
- can be done for the tubercles / ulcers that are situated away from ureteric orifice

**Q: What are the two types of contracted Bladder (Bldr)?**

A:

1. Reduced capacity Bldr (150 – 200ml)
2. True Bladder contracture (0-50ml) thimble bladder

**Q: What is the bladder appearance in late stages of T.B.?**

A: Small, irregular, contracted, calcified eventually non fn (auto cystectomy)

**Q: What is thimble and thimble bladder?**

A:

- Thimble is the protective metal cap worn by tailors on the thumb or index finger to protect needle injuries.
- When the size of urinary bladder shrinks to the size of thimble it is called thimble bladder

**Q: What is the patient presentation in GUTB with Bldr involved?**

A: Intractable frequency, Urgency, pain

Hematuria

Fixed urine output of nearly 150 ml

**Q: Is the urothelium of the bladder favorable or hostile for mycobacterial growth?**

A: Highly hostile: Bacteria are present for years in urine before they cause bladder involvement.

**Q: How will you differentiate TB Bladder from schistosomiasis bladder?**

A: Intra luminal ureteric calcification is rare in TB

- Mucosal only calcification = Mycobacterium TB
- MTB is a mucosal disease that enters mucosa through lumen of bladder
- . Solid wall calcification → Schistosomiasis

**Q: what are the D/Ds for voiding frequency?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A:

- TB
- Neurogenic
- Neoplastic
- Stone
- Chr. Cystitis

**Q: What is the difference b/w cystitis of TB v/s BCG cystitis?**

A: The histologic features of granulomatous cystitis depend on the etiology.

- Infection with tuberculosis presents as caseating granulomas with Langerhans giant cells predominantly in the lamina propria. Mucosal ulceration may be also present.
- The presence of noncaseating granulomas with the background of acute and chronic inflammation and superficial ulceration is suggestive of bacillus Calmette-Guerin (BCG) treatment
- Wide referral.. MEDSCAPE... Pathology of Cystitis Author: Reka G Szigeti, MD, PhD;

**Q: What is the most common genital organ involved in males & in females?**

A: Epididymis (globus minor) 40%,  
Fallopian tubes in female 40%

**Q: What part of uterus / prostate is involved in GUTB?**

A: Endometrium (uterus)  
Prostate – Peripheral Zones

**Q: What is the most common involved part in male Genitalia?**

A: Epididymis (globus minor)

**Q: Which part of epididymis is involved first?**

A: Globus minor 40%

**Q: What is Globus major & globus minor in epididymis?**

A:

- Globus major ; Head of Epididymis
- Globus minor :- Tail of Epididymis

**Q: What is the Hallmark of Genital Tb?**

A: Beaded epididymis & Vas

**Q: How will you diagnose endometrial TB?**

A:

- Endometrial Biopsy has low yield 40%

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Dilation & curettage of complete endometrium done in late (secretory) phases of menstrual cycle is needed; fl/by Histopathological / culture of the obtained tissue

### **Q: what are the presenting modes of male genital TB?**

A:

- acute Epididymo Orchitis 40%
- Scrotal / Testicular mass on abscess 20%
- Infertility 10%
- Beaded vas / epididymis
- Most common site involved is Epididymis
- Most rare site to involve is testis

### **Q: WHAT ARE THE CAUSES/ D/D OF BEADED VAS?**

A:

- TB
- Chronic prostate-Epididymitis
- Post NSV
- Spermatic granuloma
- Chlamydial infections
- Epididymal cyst
- Epididymal tumours

### **Q: How are Testis / Epididymis / Vas Involved in GUTB?**

A:

- Epididymis → Primary Landing site (globus minor) Fibrous, obliterated lumen
- VAS → Direct extension from epididymis beaded vas
- Testis → direct extension, necrosis of Testis → small rubbery testis
- Prostate → Primary Landing Site → features S/o chr. Prostatitis

### **Q: How will you describe the involvement of Seminal vesicle / prostate / E.D.?**

A: Clinically it is one disease; –separate involvement cannot be depicted

### **Q: What are two modes of presentation of seminal vesicle TB?**

A:

1. Inflammation, scarring, obstrn at the ductal orifice leading to dilation of the S.V .
2. Inflmn / scarring of the prostate & S.V leading to shrinking of the s.v / prostate  
This leads to granulomatous Rn & calcifn of S.V / prostate / E.D.

### **Q: How can you differentiate b/w the two forms?**

A: Type 1: TRUS give s/v dilation

Type 2: on DRE- Hard prostatic nodules and hard S.V.

- Pelvic X-ray → prostatic and seminal vesical calcification
- TRUS – no dilation of S.V

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the pathognomic feature of genital TB with seminal vesical involvement?**

A: atrophic, fibrotic seminal vesicles with ejaculatory duct strictures / obstruction.

**Q: What is the fertility prognosis?**

A: Bad, ART Advised

**Q: How will you manage these patients of E.D.?**

A:

Type 1: → TURED

Type 2: excision of the fibrosed segments and END TO END anastomosis or advise IVF / ICSI.

**Q: How are the results of IVF / ICSI?**

A: Results are good as the testicular sperms are available (Testis is not involved)

**Q: What is Watermelon scrotum?**

A: The development of scrotal tubercular abscess & gradually giving up of skin with multiple sinuses. Most of the tubercular sinuses are located on posterior surface of scrotum because epididymis is posterior to testis.

**Q: What is the difference B/W scrotal sinus of TB v/s Gonococcus?**

A: TB sinus → Posterior

Gonococcus → anterior

**Q: What is the peculiarity of TB scrotal sinus?**

A: Sinus is on posterior wall of scrotum, b'coz sinus communicating with epididymis.

**Q: What are the types of lesions in penis?**

A:

1. "Pea" size nodules in cavernous tissues  
isolated pea size masses can be felt in cavernosal bodies & sometimes under skin  
Due to hematogenous spread  
Common type of lesion
2. TB ulcer occurs over glans  
Due to sexual transmission from partner from oral or vaginal source

**Q: What is the most common presentation of 'GUTB' with HIV?**

A: Prostatic Abscess

Spontaneous recto urethral fistula

**Q: What is "watery -Can" perineum?**

A: Chronic Prostatitis + Prostatic Abscess → Collection into perineum → Multiple sinuses



**Q: What happens to PSA in GuTB?**

A: raised in early stages (due to prostatic inflm)  
low in late stages (due to glandular destruction)

---

***TB Clinical Presentation***

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**Q: What is the sex ratio for GUTB?**

A: M: F = 2:1 for GUTB

**Q: What is the common age of presentation for GUTB?**

B: 4th decade (31-39)

**Q: What are the m.c presenting features?**

A:

1. Storage LUTs (>50%)
  2. Hematuria
  3. Loin pain
  4. Sterile pyuria 25%
  5. Constitutional symptoms – 20%
  6. Passage of caseous material < 5%
- } 30%

**Q: What % of pts will have constitutional symptoms?**

A: less than 20%

Fever, anorexia, wt loss, night sweets

**Q: How will you diff b/w TB v/s schistosomias?**

A:

- stones are more in schistosomias
- Prostate is normal in schistosomias
- Genital lesions are more in TB

**Q: What is the m/c symptom in GuTB?**

A: Frequency / nocturia with fixed urine output

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What % of pts are presented as only sterile pyuria?**

A: 25% of TB cases present only as sterile pyuria.

**Q: What is D/D of fixed Bldr capacity?**

A:

- TB
- Neurogenic
- Neoplastic
- Stone
- Chr. Cystitis

**Q: What are the m/c +ve findings in physical Examination?**

A:

- hard Epididymal nodules
- Beaded vas
- Enlarged / firm seminal vesicles on DRE

**Q: What % of pts already have fn loss of kidney at the time of presentation?**

A: 25% pts already have fn loss of kidney at the time of presentation.

**Q: What % of pts have renal failure (B/L)**

A: 10% of TB pts have renal failure (B/L)

**Q: what are the presenting modes of male genital TB?**

A:

- acute Epididymo Orchitis 40%
- Scrotal / Testicular mass on abscess 20%
- Infertility 10%
- Beaded vas / epididymis
- Most common site involved is Epididymis
- Most rare site to involve is testis

**Q: What will USG Scrotum reveal?**

A: Hypo echogenicity in epididymal & Testicular locations

**Q: What is the Hallmark of Genital Tb?**

A: Beaded epididymis & Vas

**Q: What is the D/D for GUTB?**

A:

## **Neeraj Sharma's ...Notes For Urology Practicals**

- GUTB
- Chr cystitis
- Bladder Stone
- CIS ca in situ
- UTI
- OAB
- chr. Prostatitis

---

## **LAB WORK UP**

### **Q: What are the methods of detection of GUTB?**

A:

1. Urine analysis - Z.N. staining, Ziehl neelson's staining
2. Urine culture
  - a. Egg based – lowenstein jenson medium (L J Medium) light green
  - b. Agar Based – middle Brook (transparent)
  - c. Liquid Broth – BACTEC 460 TB, MGIT → result in 1-2 weeks
3. PCR Test : Nucleic acid Amplification test :Gene Expert probe → 5 probe → result 6 hrs  
Dis adv: +ve for even dead mycobacteria

### **Q: what are the basic tests for establishing GUTB?**

A:

- Urine AFB smear
- Urine AFB culture

### **Q: what is the basic investigation to diagnose GUTB?**

A: demonstration of AFB in urine on ZN staining

Sensitivity 20-80%

Specificity 90%

### **Q: Is Detection of acid-fast bacilli from urine samples by microscopy Z-N acid fast stain reliable?**

A Detection of acid-fast bacilli from urine samples by microscopy (Ziehl-Neelsen acid fast stain) is not reliable, because of the possible presence of *M. smegmatis*, which are acid- fast bacilli too. The biological activity of tuberculosis can only be assessed by cultivating mycobacteria.

### **Q: What is the Organism conc. req. for ZN staining?**

A; 5000-10000 Bacilli/ml

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the volume of urine required for urine AFB- smear?**

A: Minimum 50ml of midstream catch specimen of 1st voided morning (overnight) urine

**Q: What is minimum duration of examination in microscopic examination?**

A: minimum duration of 20 min examination in oil immersion

**Q: How will you do urine AFB Smear?**

A: Early morning 1st sample → Send the whole sample → Centrifuge @ 2000 rpm/10min → Pellet formation by cytospin @ 750 rpm for 5 min → Smear → Fix using heat / alcohol → Z.N. staining

**Q: How will you do Z.N. staining procedure?**

A:

1. Make the smear
2. Fix the smear on slide using heat / alcohol
3. Pour 1% carbol fuchsin (flood with it)
4. Put slide on flame for 5 mins till fumes appear
5. Wash with water
6. Pour 20% sulphuric acid
7. Wait for 1 min
8. Wash with running water
9. Add counter stain methylene blue → keep for 2 mins
10. Wash with water
11. Examine directly under oil immersion lens without cover slip

**Q: What % of AFB smears are +ve?**

A: 20 – 30%

Results of ZN staining

- 0-9 per (100) Hundred high power field
- 10-100 per hundred HPF → 1+ (+)
- 01 – 10 per single HPF → 2+ (++)
- >10 per field → 3+ (+++)

**Q: What is the difference b/w MTB & M.leprae on ZN staining?**

A:

- M-Leprae → only acid fast
- M-TB → acid fast & alcohol fast → Dual fast

**Q: What other stain can be used to identify Mycobacterium?**

A: Auramine – Rhodamine staining

**Q: How will you do auramine – Rhodamine staining?**

A: Prepare slide – smear

## **Neeraj Sharma's ...Notes For Urology Practicals**

Cover the slide (stain) with auramine Rhodamine stain and heat fix it for 45 seconds.

**Q: What is Auramine Rhodamine stain?**

A:

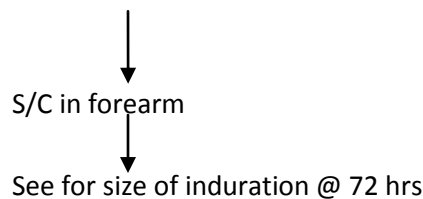
- Old method to see mycobacterium using fluorescence microscopy
- Acid fast Bacilli appear yellow
- It is not specific for mycobacterium
- Nocardia also appear yellow
- Mixture of Auramine (fluorescent) o & Rhodamine dye
- More sensitive, less specific

**Q: which other organism (other than MTB) is +ve for AFB smear?**

A: Mycobacterium smegmatis

**Q: What is Montoux Test?**

A: Purified Protein Derivatives (Tuberculin) 5 unit (0.1 ml)



**Q: What type of Immune Rx in Montoux test?**

A: Delayed Hypersensitivity

**Q: What is the principle of Montoux Test?**

A: T-cell mediated delayed type Hypersensitivity Rn

0.1 ml of PPD (Purified protein Derivative) s/c  
see result after 48-72 hrs

**Q: How are the results of Montoux test interpreted?**

A:

- >15mm = +ve for TB
- >10 mm : positive for high risk persons of TB, like HIV like injuries, resident and residents of high risk areas like prisons, health care , lab persons.
- >5mm = least chances of TB +ve, considered +ve only in pts of HIV, Transplant pts / Relatives of TB pts

**Q: What is the most common cause of false +ve Montoux?**

A: BCG vaccination

Subclinical infn / exposure

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the status of Montoux Test?**

A: Out dated; not specific

**Q: How can you definitely diagnose GUTB?**

A:

1. Culture sensitivity – solid media,
  - Liquid media --Radiometric (Bactec – 460)
  - Liquid media --non radio metric (CO<sub>2</sub>) BACTALERT
2. PCR chain amplification (NAAT) nucleic acid amplification Test

**Q: What is the urine Sample used?**

A: WHO recommendation is atleast 3, preferably 5, early moving first void are required (volume required is 50-100 ml per sample)

- Intermittent shedding of bacteria
- Bacterial load is comparatively more in overnight sample

**Q: what is the volume of urine required for urine culture?**

A: 50-100 ml

**Q: Why early morning sample is taken?**

A: Because bacterial shedding is intermittent, so the total no. of bacteria will be maximum in an overnight sample.

**Q: What will you do if pt has frequency?**

A: Catheterize the patient & Bag with Preservative (Thymol)

**Q: How many specimens are required?**

A: Early moving first void x 5 samples

Minimum 3; ideally 5

**Q: What is the urinary preservative used?**

A: No Preservatives

**Q: What are the standard solid media?**

A:

- L.J. media (egg based) light green in colour
- Middle Brook (agar based) (Transparent)

Middle brook gives result in middle that is 1-14 days colonies can be seen against transparent surface.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Which solid media is transparent?**

A: Agar media is clear (middle brook)

**Q: which is the other solid media?**

A: Lowenstein Jensen – Egg Based Media

**Q: What are the optimizing factors added to inhibit the growth of other organisms?**

A: Malachite green (Aniline dyes) (In L.J media)

**Q: What are the advantages of Agar based media?**

A: Agar based media are transparent ; and thus they facilitate early viewing of colonies (By 1 wk)

**Q: How will you identify which species are growing on culture?**

A: DNA strip test of growing colonies

DNA strip test can identify Myco TB v/s M.Bovis v/s M. Africanum.

**Q: What is the sensitivity of urine cultures?**

A: Sensitivity 80-90%

Specificity 100%

**Q: In what duration will you get the results?**

A: +ve result declared @ 6 wks

-ve results are declared @ 8 wks

**Q: Suppose AFB smear was (+ve) and AFB culture is showing no growth; then what will you do?**

A: Wait till 12 wks before giving a negative report.

**Q: How will you do AST (Antibiotic sensitive test)?**

A: On the same culture plate

Q: When can urine culture show E-coli in TB cultures?

A: As super added infn

**Q: What are the std. liquid media?**

A: Bactec 460 → Radio metric

Bactec MGIT → Fluro metric

**Q: In what duration the results will come?**

A: 7-14 days

**Q: which liquid media is not used?**

A: Bactec 460 is out of date because of radio hazard, Only MGIT is used.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What is Bactec 460?**

A:

- Bactec 460 TB is a liquid culture media.
- Bactec 460 TB – Contains radioactive  $^{14}\text{C}$  substrate which when used by mycobacteria lead to formation of  $^{14}\text{CO}_2$ , which is quantitatively measured
- Duration – 10-14days
- Sensitivity - 92%
- Bactec 460 is not used now because of radio hazards.

### **Q: What is Bactec MGIT (Mycobacterial growth indicator tube)?**

A:

- Oxygen quenched (supersaturated) system
- Flurochrome – silicon is used as marker
- Oxygen in system prevents the flurochrome reaction
- Reduction in O<sub>2</sub> amount (due to mycobacterial consumption) leads to uninhibited flurochrome action hence fluorescence generated in MGIT tube
- This fluorescence is measured under U.V light
- Duration – 10-14days
- Sensitivity - 95%

### **Q: What is latest test in Diagnosis of Tb?**

A: Polymerase chain reaction (PCR) has been extensively studied and has been proven highly sensitive, specific, and rapid. In various studies, data show a sensitivity ranging from 87% to 100% (usually >90%) and a specificity from 92% to 99.8% (usually >95%). Compare this with cultures (37%), bladder biopsies (47%), and intravenous pyelography (IVP) examinations (88%).

Along with an accurate clinical assessment, PCR is the best tool available for avoiding a treatment delay, because results are available in only about 6 hours. The following PCR tests are available with near-equivalent quality:

- Genus-specific 16S rRNA PCR test
- Species-specific IS6110 PCR test
- Roche Amplicor MTB PCR test
- Amplified *Mycobacterium tuberculosis* Direct Detection Test (AMDT)
- Gene expert MTB / Rif

RIF → Stands for RIFAMPICIN

→ Test can detect rifampicin resistance of MTB

Cost around Rs 2,500/- → 4,500/-

DNA probes provide species specification in a few hours

### **Q: What is the best method of diagnosis?**



## **Neeraj Sharma's ...Notes For Urology Practicals**

A: Combo =PCR + Urine culture / Z.N. staining

**Q: What is the principle of Gene Xpert?**

A: Gene Xpert MTB detects DNA sequences specific for mycobacterium Tuberculosis MTB & rifampicin resistance by PCR

Uses NAAT (Nucleic acid amplification test)

Results are available in 2-3 hrs for MTB

Results are available in 2 days for rifampicin resistance

**Q: Which gene mutation causes Rifampicin resistance?**

A: RNA Polymerase Beta (RPO-B)

**Q: what is the name of Commercially available PCR- kit for TB?**

A: Gene expert probe – Rs. 2500 / per sample

**Q: what are the disadvantages of Gene expert probe?**

A: False +ve, Dead & atypical bacteria are also amplified

**Q: How do you depict positivity in Gene expert probe?**

A: all '5' probes should be +ve

**Q: which urine sample is sent & why?**

A: 1st Void early sample

**Q:What is the disadvantage of Gene Xpert?**

A: Comes +ve for dead bacteria also ,so cannot be used for fl/up.

**Q: what is the most common Biochemical Abnormality in GUTB?**

A: Hypercalcaemia {not Hypercalcemia}

- Secondary to abnormal calcitriol production by granulomatous tissue

**Q: what is QuantiFERON TB Test?**

A: also known as IGRA interferon gamma release assay.

- Whole blood sample assay → ELISA based → Identifies antigens itself (not antibody)
- cannot differentiate b/w active v/s latent / old TB

**Q: How can you detect anti TB antibodies?**

A: TB serum rapid screen test

- Uses chromic immune assay to detect IgM & IgG
- Raised levels Depict active TB

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you find out that the given stricture is due to old/ healed fibrosis of active ongoing inflammation?**

A: Predictors of active inflm are

- ↑TLC / ↑ DLC / ↑ESR
- Raised anti TB antibody titres (serological Tests)
- Microscopic hematuria
- Pyuria
- +ve Bactec Test
- +ve Versatrek Test (urine)

**Q: how is the PSA in GUTB –low, or – high?**

A: low, b'coz of glandular destruction (in chronic stage)

**Q: What are the major & minor criteria for TB?**

A:

Major	Minor
<ol style="list-style-type: none"><li>1. AFB +ve urine</li><li>2. PCR +ve urine</li><li>3. Histopathology s/o Granulomatous lesion</li></ol>	<ol style="list-style-type: none"><li>1. Raised ESR</li><li>2. Hematuria</li><li>3. +ve CXR</li><li>4. IVP/CT s/o TB</li></ol>

**Q: What number of criteria can establish GUTB?**

A: One major or two minor

---

## **Radiology GuTB**

**Q: Is there a role for pulmonary evaluation in a GUTB pt?**

A: yes, it is must

- CXR,
- 3 sputum smear AFB is must
- Check for H/O previous AKT
- Check for H/O HIV
- 50% of CXR-PA will show some old, healed lesions
- 10% of CXR-PA will show active lesion

**Q: What is the choice of Ix in GUTB?**

A: CT urography

- Renal parenchymal mass / defects can be seen

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Thickened ureter / Bldr
- Extra luminal changes
- Adrenal involvement is seen
- If the kidneys are non functioning then IVP is useless so CT scan

**Q: What X rays will you order for GUTB?**

A:

- CXR – PA
- X-ray KUB

**Q: Do you expect an active TB lesion in CXR in Pt of GUTB?**

A: Usually No, because GUTB occurs 10-15 yr after chest TB but 10% may have active TB. Lesion

**Q: what do you expect in CXR-PA?**

A: 10% active lesions

50% old healed fibrotic scars

**Q: when can you find active lesion of TB in CXR along with GUTB?**

A: Miliary TB (with HIV), post renal Tx

**Q: What do you expect in X-ray KUB?**

A: 30% of x-ray KUB are +ve for some findings

Calcified –

- L.N
- Adrenal, prostate, S.V
- Kidney calcification
- Triangular calcification → of papillary necrosis

Bone Image

- Psoas abscess
- Vertebral disease
- Vertebral body erosions

**Q: What are the types of calcification?**

A:

1. Dystrophic : occurs in dead tissue, sr.Ca++ levels are normal
2. Metastatic → Occurs in viable tissue, sr. Ca++ levels are raised

**Q: what type of calcification occurs in GUTB?**

A: Dystrophic calcification

**Q: Can you stage the disease on calcification patterns?**

A: early: small, discrete, amorphous calcifn

## **Neeraj Sharma's ...Notes For Urology Practicals**

Late: large, Coalesce, calcified masses

### **Q: what is putty kidney?**

A;

- Homogenous, dense, ground glass like calcification on x-ray
- Forms the lobar cast of kidney
- Advanced disease stage
- Usually associated with non functional kidney

### **Q: What is lobar putty kidney?**

A: As TB involves kidney lobes individually & independently; putty formation may also be lobe by lobe.

### **Q: what will you see in USG – Bladder?**

A:

- Bladder wall thickness
- Bladder stone
- Full Bladder Volume
- PVRU

### **Q: What will USG Scrotum reveal?**

A: Hypo echogenicity in epididymal & Testicular locations

### **Q: what is the role of USG?**

A:

- Limited role in diagnosis
- May be used for follow-up of patients presenting with Hematuria during course of treatment.
- Max we can see is small parenchymal abscess and peri-nephric abscess or Hematuria or dilated calyx.

### **Q: what will you see in USG kidney in particular?**

A:

- Cortical Medullary Differentiation loss
- Hydrocalicosis
- Hydronephrosis
- Secondary Stones

---

## ***IVP***

### **Q: In what % of GUTB cases, IVP will be +ve?**

A:

- 58% cases IVP will depict GUTB.
- 15% cases IVP will be negative in GUTB +ve Patient

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are features seen in IVP?**

A:

- Fuzzy calyx is the first sign.
- Moth eaten appearance of calyceal erosion
- Infundibular stricture
- Hydrocalicosis
- Phantom calyx
- Cicatrized pelvis,
- PUJn stricture
- Pipe stem ureter
- Cork screw ureter
- Lower ureter stricture,
- VUJn stenosis

**Q: what is Kerr's kink?**

A: It is the typical scarring & kinking of PUJn on IVP – due to perisinus lymphatic adherence and involvement.

**Q: When does renal TB become radiologically evident?**

A:

- Rupture of Papilla & Ulceration of Calyx is called fuzzy calyx.
- It is the first sign to appear on IVP

**Q: What are the m/c findings of IVP?**

A:

- Hydrocalicosis (due to infundibular stricture)
- Hydronephrosis (Due to PUJ stricture)

**Q: What is the first sign on IVP?**

A: Fuzzy calyx, It is due to papillary edema

**Q: What is the first finding in IVP?**

A: fuzzy calyx, Calyceal Irregularity

**Q: What is the first sign to be well appreciated on IVP?**

A:

- Moth eaten appearance of calyx
- Seen in excretory phase film

**Q: What is moth-Eaten kidney appearance?**

A:

## **Neeraj Sharma's ...Notes For Urology Practicals**

1. Moth eaten appearance of calyces in IVP are the ragged margins of calyces due to destruction of papilla
2. Multiple cortical granulomas coalesce, cavities are formed which communicate with PC and appear as moth eaten kidney on USG.

**Q: Do TB cavities communicate with collecting system?**

A: yes

**Q: What is phantom calyx?**

A:

- Completely cut off calyx due to complete infundibular stricture.
- On IVP; actually phantom calyx is a/w phantom renal segment; b'coz renal segment is also not seen.
- Ideal phantom calyx is depicted in RGP finding, where the contrast doesn't enter a calyx

**Q: In which IVP film calyces are best seen?**

A: 10-15min

**Q: What is FRALEY's syndrome?**

A:

Fraley syndrome is a condition where the superior infundibulum of the upper calyx of the kidney is obstructed by the crossing renal (upper or middle section) artery branch, causing distension and dilatation of the calyx and presenting clinically as haematuria and nephralgia (ipsilateral flank pain). The condition was first described by urologist Elwin E. Fraley in 1966 and can be treated surgically, which might be necessary in symptomatic disease.

Another possible cause for similar hydronephrosis is megacalycosis, for which surgery is considered inappropriate.

Fraley syndrome is to be distinguished from infundibular stenosis due to T.B.

**Q: Suppose the kidney is poorly fn then how will you evaluate this kidney ?**

A: Do CT scan

**Q: What is the appearance of ureter in GUTB?**

A: Ureteric dilation & ragged irregular appearance of the urothelium are the first signs of ureteric T.B (Beaded/Cork screw ureter) Pipe stem ureter

- Obstruction @ U.V Jn
- Golf hole U.O.

**Q. What is cork screw ureter?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A; in GuTB, dilated and tortuous ureter appears as a cork screw in IVP study/ct scan. This appearance is due to local areas of dilatation and focal areas of constriction.

- When alternate dilated and narrow segments ( beaded) → cork screw appearance

### **Q. What is pipe stem ureter?**

A;

- pipe here refers to the smoking pipe. Pipe stem appearance here refers to the straightening and rigidity that ureter attains due to long standing inflammatory changes.
- On IVP when ureter appears rigid & straight → pipe stem

### **Q: what is the difference of ureteric calcifn b/w TB & schistosomias?**

A:	TB	Schistosomias
Ureteric calcification	Rare	Common
Type	Intra-luminal	Mural

### **Q: When will you get “fur tree” like bladder in IVP?**

A: Neurogenic bladder

### **Q: What are the sequences of events in GUTB?**

A: Fuzzy calyx → Destruction of calyx (moth eaten calyx) → papillary necrosis → Infundibular stenosis → Pyelitis → fibrosis & scar → PUJ / VUJ involvement → Bladder involvement

### **Q: How will you decide early & late stages of bladder involvement in IVP?**

A:

- Early stage :- round spastic Bladder
- Late stage:- Thimble bladder , Hour glass contracture

### **Q: What is the imaging investigation of choice? & why?**

A: CECT Abdomen

C.T:

- Gives assessment of renal parenchyma and its abscess / Granuloma / Cavities
- Thickening of pelvic wall, ureteric wall
- Peri-hilar L.N.
- Peri nephric stranding
- Assessment of non fn calyx / kidney
- Assessment of liver, spleen, L.N
- 3D reconstruction images
- Adrenal status, Prostate, S.V involvement
- C.T is the most sensitive Ix to see for calcification.

### **Q: what is the CT appearance of Caseation / necrosis?**

A: Hypo-attenuated

### **Q: What is the H.U. of renal abscess?**

A: Abscess has low attenuation 10-15 HU

## **Neeraj Sharma's ...Notes For Urology Practicals**

appear as moth eaten kidney on USG

**Q: what will you specially see on CT scan for a suspected T.B. patient?**

A:

- ➔ Adrenal – B/L enlarged with areas of necrosis
- ➔ Renal parenchyma /HN/HUN
- ➔ Ureteric wall thickness
- ➔ Bladder Thickness

**Q: What will you do for prostate nodule?**

A: TRUS + Biopsy (even if PSA is low)

**Q: If TRUS show prostatic abscess?**

A: Aspirate for smear & culture

**Q: What if after 2 months of AKT – Gen Cond'n improves, but LUTs does not improve?**

A: Check Bladder compliance & capacity

**Q: What are the complication/ consequences of granulomatous prostatic abscess**

A: Wide prostatic fossa with contracted bladder

With +/- urethral stricture

With prostatic abscesses giving moth eaten appearance can VCUG / MCU (due to multiple cavities)

**Q: When will you stent T.B. ureter?**

A: at the start the chemo Rx

Or after 15 days of AKT

**Q: How long to keep stent?**

A:

- As Fibrosis occurs in first 6 wks; so stent should be kept for minimum of 6-8 wks .
- Ideally stent should be kept till the intensive phase of AKT is over
- can be contd. upto 1 yr (6month – 12 months)

---

## ***Treatment...general***

**Q: What was the 1st / 2nd / 3rd anti tubercular drugs discovered?**

A: 1st streptomycin / 2nd PAS / 3rd INH

**Q: How does the drug resistance occur?**

A: 1/10,000 organisms are mutant. Survival advantages to mutant organisms and their eventual growth leads to development of drug resistance.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What are the subpopulations of TB bacteria & what drugs act on them?**

A:

1. Continuous growing → INH > SM > RMP
2. Acid inhibiting → PZM  
Caseous Necrosis
3. Spurtic Growth } RMP  
Slow growing }
4. Dormant/non-replicative → no drug effective

**Q: What is the role of EMB?**

A: Bacteriostatic for continuous growing population

**Q: What is acid inhibiting environment & what are the drugs used?**

A: Inside caseous necrosis and inside phagolysosomes (macrophages) there is acidic environment. MTB can change this acidic pH. PZM is the most effective drug in this. B'coz it gets converted to pyrazonic acid and thus changing the phagosomal pH back to acidic; which then helps in digesting the engulfed bacteria

**Q: How long can we give PZM?**

A: effect occurs for upto 2 months, no use after 2 months

**Q: on what subgroups of MTB the AKT drugs act?**

A; INH → kills the rapidly / actively multiplying bacteria

RMP → acts on slow growing / slow multiplying bacteria

PZM → acidic environment / Hidden Bacilli

**Q: what is DOTS?**

A: Directly observed treatment short course

**Q: What are '5' components of DOTS?**

A:

1. Political commitment
2. Case detection by Bacteriology
3. Standard Treatment
4. Effective drug supply
5. Monitoring & evaluation & documentation

**Q: what is the type of GUTB / Category / Regimen?**

A:

- Extra pulmonary seriously ill
- Category I
- Regimen 2 HRZE+ 4 HR

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the doses of HRZES?**

A: H-300 mg                      5 mg/kg/day  
R- 450mg/dose                10mg/kg/day  
Z-1500 mg/dose               25mg/kg/days  
E- 1200 mg/dose              25mg/kg/days  
S-750 mg/dose                15mg/kg/days

**Q: What was category II previously?**

A: Sputum smear +ve → relapse / failure/ Treatment default

**Q: What is Category 3 previously?**

A: New "sputum-smear" negative – not seriously ill  
New extra pulmonary – not seriously ill.

**Q: What is the present clinical category of GUTB?**

A: Cat I

**Q: what is the difference b/w standard drug regimen & DOTS regimen?**

A:

- Standard drug regimen is daily dosage of all four drugs all days (Rifampicin 300 mg/OD)
- DOTS regimen is all four drugs on alternate days (Rifampicin is 600 mg)

**Q: which is better daily dosage / DOTS?**

A: daily dosage is better

**Q: when can you surgically intervene?**

A: after 4-6 wks of ATT drugs

**Q: What are the present categories of GuTB?**

A:

- Cat I → all primary cases – Pulm, - extra pulm  
Irrespective of seriously ill or non-seriously ill
- Cat II → Defaulters, relapse

**Q: Is there any role of concomitant steroids?**

A: No role in GUTB, only TB meningitis / TB pericarditis has proven role for steroids

In adrenal TB steroids are given

**Q: What is the dose modification required in renal failure?**

A: INH, Rifampicin and Pyrazinamide (HRZ) → NO dose adjustment required as these medicines are excreted in bile

Ethambutol

1. Reduce daily dose to half

## **Neeraj Sharma's ...Notes For Urology Practicals**

2. dose interval needs to be prolonged due to impaired creatinine clearance

### **Q: what are the chief ADRs of HRZE?**

- H- Hepatitis, peripheral neuropathy, Hypersensitivity (rash, fever), Disulphirum like Rx to alcohols
- R- Red-orange discoloration of urine, anorexia, Thrombocytopenia, hepatitis, Cholestasis
- Z- Hyperuricemia, joint pain
- E- Eye disturbances – retro bulbar optic neuritis, Peripheral neuropathy
- S- Sensory hearing damage, kidney damage

### **Q: What else is must to see before and during AKT Rx?**

A: Baseline values of LFTs, RFTs,

### **Q: What is IRIS and in whom it occurs?**

A: IRIS – immune Reconstitution-Inflammatory syndrome

- It is the appearance of new lesions in lung/ pleura/ Brain/ Meninges/ Lymphadenopathy or deterioration of existing lesions in a pt who is on adequate & proper AKT
- Occurs in pt of HIV co infn

### **Q: How much duration is required to form drug resistance to fluoro - Quinolones?**

A: around 2 wks (10-14 days)

### **Q: What are the side effects of fluoroquinolones?**

**A:** The common side effects of the fluoroquinolones are gastrointestinal disturbances, headaches, skin rash and allergic reactions. Less common but more severe side effects include QT prolongation, seizures, hallucinations, tendon rupture, angioedema and photosensitivity.

### **Q: What are the 2nd line drugs?**

A:

Ciprofloxacin	Vancomycin	Capreomycin	PAS
Levofloxacin	Kanamycin		
Moxifloxacin	Amikacin		

### **Q: What is drug resistant (DR) TB?**

A:

## **Neeraj Sharma's ...Notes For Urology Practicals**

- ➔ DR-- Resistant to anyone of the 1st line H/R/Z/E
- ➔ MDR – resistant to H & R plus-- Z / E/S/ 2nd line
- ➔ XDR-TB – Resistant to (HR + Fluroquinilone)+Aminoglycoside or Capreomycin or both

### **Q: what is the Rx of MDR – TB?**

A: 5 drug therapy for upto 18 months after cultures becomes negative

EECOPK x 9 months → Ethambutol, Ethionamide, cycloserine ofloxacin, PAS, Kanamycin

EECO x 18 months → Ethambutol, Ethionamide, cycloserine, ofloxacin

### **Q: How long to treat HIV patient with TB?**

A: 9 month therapy

### **Q: why in Transplant pts AKT drugs doses are reduced**

A: Because effect on cytochrome P-450 interaction

### **Q: What is Mx of GUTB?**

A: Step 1 → Medical Mx AKT.

Step 2→ Relieving Obstruction – DJ/PCN

Step 3→ Correcting deformity

## ***GUTB Management.....KIDNEY***

### **Q: What are indications of partial Nx in GUTB?**

A: there are only 2 indications for partial Nx

1. A localized polar lesion with calcifn that has failed to respond after 6 wks of chemo AKT
2. An area of calcifn that is slowly increasing in size & threatening to gradually destroy the entire kidney

### **Q: what is the Indn of Nephrectomy in GUTB?**

A: Indn for Nx in GUTB (Dr. NP Gupta et al 2006)

1. Non fn kidney
2. Suspected malignancy
3. Total Parenchymal loss

### **Q: Will you do Nx for all non fn GUTB kidney?**

A: Yes: (Dr. Gupta et al)

- Because if even non fn kidney keeps discharging MTB in urine.
- Any dormant bacteria in non fn kidney can re-active any time in future (Fletcher, Fisher, Flemm)

### **Q: what is the approach for Nx in GUTB?**

A: Flank approach

## **Neeraj Sharma's ...Notes For Urology Practicals**

Totally extra peritoneal / extra – Pleural

**Q: what will you do for an asymptomatic non fn Tuberculous kidney & why?**

A: Surgical removal / Nx for the fear of reactivation of dormant Bacilli which may spread also here also .  
so, Nx is done

**Q: What is the m/c operation performed in GUTB?**

A: Nephrectomy

**Q: what will you do with non fn calcified kidney?**

A: Remove it

**Q: What approach should be taken for Nx of Tuberculous kidney?**

A: Flank Position + Posterior approach as kidney is usually severely adherent to colon anteriorly

- Remove ureter as much as possible
- Laparoscopy is contra indicated (adhesions) (high conversion rates)

**Q: Are viable bacilli present in non fn calcified kidney?**

A: yes (but may / may not grow)

**Q: What are the parameters for renal salvagability?**

A: 

<ul style="list-style-type: none"><li>- GFR &gt; 15 ml/min</li><li>- Cortical thickness &gt; 1 cm</li></ul>	}	are good parameters to save kidney by interventions. also called Ramanathan's Criteria
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**Q: what is the dis adv of RGP?**

A: Can disseminate the disease.

**Q: what are indn for Nx in GUTB?**

A:

- TB + non fn kidney
- TB+ Unsalvageable kidney + HTN
- TB + RCC

**Q: How will you approach kidney?**

A:

- Retroperitoneal approach through Lumbar incision, Better to take with gerota's fascia ,
- avoid entering peritoneum & Pleural spaces
- Avoid laparoscopy

**Q: If you need to do pyeloplasty, which one will you do?**

A:

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Foley Y-V Pyeloplasty as there will be fibrosis in peri-pelvic region
- Avoid – Anderson hyne's
- Or do uretero calycostomy

**Q: which pyeloplasty is done in GUTB?**

A: Only foley VY pyeloplasty is done over a stent in GUTB

**Q: how will you manage multiple infundibular strictures?**

A: Do infundibuloplasty

**Q: how will you do infundibuloplasty?**

A: open the kidney on the Brodel's line like a book, Reach the PC system. Open the P.C system and stitch the edges of adjacent calyces.

**Q: What is the practical approach for management of Infundibular stenosis?**

A: Do Infundibulotomy

**Q: what are the ways of doing Infundibulotomy?**

A: Retrograde (with flexi ureteroscope) (over guidewire)  
Antegrade (like pcnl)

**Q: By what measures can you cut the infundibulum?**

A:

1. Either pure cutting current @ 75 watts cautry
2. Or 200/375 laser fibre HO:YAG

**Q: Which side will you make incision?**

A: Antero-medially (espl on upper infundibular stenosis)

B'coz posterior division artery runs posterior to upper infundibulum

**Q: what stent will you deploy after infundibulotomy?**

A: Any large bore 12 FCH stent

Or endopyelotomy stent

**Q: When will you remove the stent?**

A: after 6-8 weeks

**Q: will you deploy an additional nephrostomy tube?**

A: If antegrade infundibulotomy is done then deploy nephrostomy tube for 2-3 days and endopyelotomy stent for 6-8 wks.

**Q: what will you do if the guidewire is not going across the infundibular stricture?**

A:

Inject methylene blue from the other side of cavity; the point through which the methylene blue enters this side should be cut upon using knife / laser

Methylene blue through RGC

See the dye entering through infundibulum

Cut the area

**Q: what will you do if even contrast is not going through the infundibular stricture?**

A:

1. Deploy nephroscope in calyx  
Deploy RGC in pelvis  
Probe with guide wire through RGC  
See the indentation of wire by nephroscope  
Cut on the wire or push the stiff end of wire through into the calyx. Catch the wire and pull out through nephrostomy & deploy stent over it
2. Endoscopic "cut through the light" using dark/light fields. Requires 2 surgeons & one ureteroscope & one nephroscope

**Q: what are the results of Infundibulotomy?**

A:

- Chances of success  $\geq 80\%$  in expert hands
- Short time results are excellent
- For short & less dense strictures the results are good
- For long & more dense strictures the results are not so good

**Q: What is the type of pyeloplasty done in GUTB?**

A: Pelvis is scarred; "hiked up" into the kidney with lots of peri ureteric & Peripelvic adhesions

- A dismembered pyeloplasty is not feasible
- Even a flap pyeloplasty is not feasible if pelvis is so scarred & small
- A Foley Y-V plasty is usually done

**Q: if still renal pelvis is very small and not as amenable for any repair then?**

A: Do – uretero Calycostomy.

---

## **GUTB-Management.....DJ stenting**

**Q: which is the best mean to relieve obst<sup>n</sup>?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A: there is no proven best method but according to ease of patient management and compliance

- Best → retrograde DJ stent
- Better → antegrade DJ stent
- Good → PCN tube

**Q: what is the need for D.J stenting?**

A: Ureteric Strictures, PUJn Obstrn

Facilitates passive dilation of ureter

Prevents further worsening of stricture by acting as splint

**Q: When surgical Intervention is necessary?**

A: deterioration / no improvements after 6 wks of DJ Stenting

**Q: what are the indications for PCN?**

- A:
- multiple infundibular structures
  - Cut off calyx from rest of kidney
  - Cicatrized renal pelvis

**Q: When can you do a definitive re-constructive Sx?**

A: after 2 months of intensive phase AKT therapy

**Q: what are the two categories of ureteric strictures?**

A: Cat I → simple / uncomplicated / short

Cat II → complex / complicated / long or bilateral

**Q: what are the chances of successfully deploying DJ stent?**

A: 50% to 70 %

**Q: what is the dis-adv of RGP and stenting?**

A: High pressure RGP can cause dissemination of disease

**Q: What are the indn for DJ stenting?**

- A:
- |                              |   |                 |
|------------------------------|---|-----------------|
| 1. early disease             | } | for 6-12 months |
| 2. Short stricture not dense |   |                 |

**Q: what is the indn for doing definite Sx correction?**

A: when stricture is not improving even after 6 wks of AKT.

**Q: When will you stent the system w.r.t AKT? or...**

**Q. what is the time relation between deploying DJ stenting and starting AKT medicines?**

A: At the Beginning of AKT therapy (skin et al) if the kidney is obstructed and compromised.



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Benefits of stenting should be weighed against risk of systemic dissemination of disease. DJ stenting procedure can lead to spread of T.B. bacilli and may lead to bacillemia and spread of disease to other parts of the body, especially in an immunocompromised patient and in tight strictures where chances of bleeding are more. 15 days of AKT will reduce the bacilli load in G.U. tract considerably. Hence DJ stenting should be done after 15 days of starting AKT in such cases.

### **Q: How long it takes for urine to sterilize after AKT?**

A: 2 wks from AKT Rx starts hence DJ stent is deployed after 15 ds after AKT Rx → prevent systemic spread.

### **Q: how will you do cystoscopy stenting in TB Bladder?**

A: Continuous flow cystoscopy using feeding tube as exit

- Deploy a feeding tube and then start cystoscopy
- Go directly and stent first
- Do not overfill / over stretch the bladder otherwise bleeding will start making stenting difficult
- After stenting complete cystoscopy examination

### **Q: For how long to keep a DJ stent for the Mx of stricture**

A: At least till intensive phase AKT therapy is over

### **Q: When will you stent T.B. ureter?**

A: at the start the chemo Rx  
Or after 15 days of AKT

### **Q: How long to keep stent?**

A:

- As Fibrosis occurs in first 6 wks; so stent should be kept for minimum of 6-8 wks .
- Ideally stent should be kept till the intensive phase of AKT is over
- can be contd. upto 1 yr (6month – 12 months)

### **Q: How will you fl/up a GuTB patient on stent?**

A:

- According to EAU guidelines
- Every week short IVP (= single film 20 min IVP) to look for pelvic calyceal system for 6 wks
- It is called Gow's Regime. (James Gow)
- **(no one uses /follows this Gow's protocol, try to answer what is being done at your institute and justify that)**
- If no improvement after 6 wks; pt requires surgical Mx.

### **Q: what is Gow's regime?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A: single film (20 min) IVP @ every week for 6 weeks (after James Gow)

**Q: how will you fl/up if serial IVP is not feasible due to raised sr.creat?**

A: either DMSA, or USG

**Q: When do you repeat IVP in your set up?**

A: After 2 wks

**Q: what is the dis adv of PCN over DJ stent?**

A: Corrective stage surgery is mandatory after PCN placement otherwise tuberculous cutaneous fistula invariably occurs

**Q: When will you stent the other side normal kidney?**

A: If normal no need to stent

- Stent if the normal kidney is the solitary fn kidney and affected kidney is not functioning
- On imaging if lower end of the ureter (of normal kidney) is not normal
- If pt creatinine is borderline normal 1.3/1.4 mg/dl
- Or if creatinine is frankly raised

**Q: What is the minimum fn required for endourological Mx?**

A: 25% minimum fn in ipsilateral moiety is must

**Q: what is the role of Retrograde Balloon Dilation?**

A: No definite role, success- 50-60%

Dilation to be repeated @ 2weeks initially fl /by @ 2 months

DJ stenting is still required

C/indn → stricture >2cm

→ Active inflammation

**Q: Can endo ureterotomy be done for GuTB ureteric stricture?**

A: Yes, it is a feasible option for less than 2cm stricture

Either retrograde / antegrade

- under vision / under fluro
- Endo ureterotomy is better than balloon dilation
- Lower stricture → antero medial cut
- Upper stricture → lat / Postero-lateral cuts
- Use cold knife. Laser, electrode
- Incision upto peri-ureteric fat
- Intra-lesion steroids can be applied after endo ureterotomy

**Q: when will you go for repair or ureteric stricture?**

A: Atleast 6 wks of AKT/ ATT

**Q: when will you opt for surgical management for ureteric stricture?**

A: Failure to respond in progression after 6 weeks of ATT is an indication fn definition Mx (Sx)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What will you do for lower segment ureteric stricture?**

A: Ureteric reimplant

**Q: how will you bridge gap b/w ureteric ends?**

A:

- Kidney mobilization = 3cm
- Psoas hitch = 5cm
- Boari flap = 10 cm
- Ileal Segment = Unlimited
- Mobilization of Bladder = 3 cm

**Q: what can be done for long segment stricture?**

A: Ileal segment replacement

Davis Intubated Ureterotomy

**Q: what is the problem with Boari Flap?**

A: Reduces the capacity of already fibrosed / compromised Bladder

**Q: what are the Sx options for ureteric stricture?**

A;

- Uretero – ureterostomy
  - +/- Boari flap (10cm length gain), +/- psoas hitch (5cm length gain )
- Uretero calycostomy / Pyeloureterostomy
- Trans uretero ureterostomy
- Intubated ureterotomy
- Ileal interposition (iso-peristaltic)
- Auto transplantation of kidney

**Q: Indn / contra indn for ileal substitution of ureter?**

A: Indn .....Long ureteric stricture

C/Indn – 1. Creatinine > 2 mg /dl

2. Irradiated bowel

3. Short bowel syndrome

4. Gastro-intestinal-Tb

**Q: What is the length gain by Psoas hitch & Boari flap?**

A:

- Psoas – hitch – 5 cm
- Boari – flap – 10cm ( actually depends upon bladder size)

**Q: what nerves can be entrapped in psoas hitch?**

A: femoral (L2L3L3)

## **Neeraj Sharma's ...Notes For Urology Practicals**

### Genito femoral Nerve

The femoral nerve, the largest branch of the lumbar plexus, arises from the dorsal divisions of the ventral rami of the second, third, and fourth lumbar nerves (L2-L4). It descends through the fibers of the psoas major muscle, emerging from the muscle at the lower part of its lateral border, and passes down between it and the iliacus muscle, behind the iliac fascia; it then runs beneath the inguinal ligament, into the thigh, and splits into an anterior and a posterior division.

### **Q: What is the problem with Boari flap?**

A:

- GUTB pts do not have such capacious bladder to raise a Boari flap.
- Boari flap will cause further reduction in bladder capacity

## **GUTB Management.....Bladder**

### **Q: What if after 2 months of AKT – Gen Cond'n improves, but LUTs does not improve?**

A: Check Bladder compliance & capacity

### **Q: what is the ind'n to augment Bladder?**

A: 100 ml capacity or less

### **Q: what is a thimble bladder?**

A: Capacity < 20-50 ml

### **Q : what are the ind'n for reconstructive bladder surgery in GUTB?**

A:

Bladder contracture → jeopardizing upper tract  
With frequency  
With reflux  
With progressive HN  
Intractable symptoms

### **Q: what are the principles in bladder augmentation Sx?**

A: Excise all the diseased detrusor except Bldr neck & Trigone

### **Q: what is prerequisite ATT Rx required for bladder augmentation Sx?**

A: minimum 4-6 wks

### **Q: When to augment a bladder**

A:

- When Bldr volume under anesthesia is equal to conscious bladder capacity
- Symptomatic pt
- Not improved with anticholinergics

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is conventional capacity of thimble bladder?**

A: Less than 50 ml

**Q: what is surgical compln of Augmentation?**

A:

- Hour glass contracture
- Mucous Blockage
- Neo Patch disruption
- Urinoma

**Q: What is more important in AKT v/s pregnancy?**

A: AKT

**Q: when will you do RGP in GUTB?**

A:

1. Pts with raised creatinine: in which the IV contrast is not advisable.
2. When kidney is completely blocked; so as to assess the lower ureter.
3. When to obtain a urine sample from upper tract to identify the affected side before surgical planning.
4. To assess total no of strictures.

**Q: When will you do cystoscopy?**

A: Only before Surgical management to assess bladder capacity under anaesthesia

**Q: What do expect to see in cystoscopy?**

A:

1. Cystitis ulcers
2. Golf hole ureteric orifice

Note that the finding of golf hole ureteric orifices is a late stage finding and is the least prevalent 10% only. But cystoscopy itself is done in late stages so that the golf hole ureteric orifice finding is commonly seen on cystoscopy.

**Q: Will you take Biopsies?**

A: No need, To be done only when in doubt of malignancy

**Q: what are the stages if ureteric orifice in GUTB?**

A: wide reference ...smith's urology

Grade	Type	% prevalence
grade – '0'	Cone shaped / volcano	(m/c) 50%
grade 1	Stadium orifice	25%

## **Neeraj Sharma's ...Notes For Urology Practicals**

grade 2	Horse shoe orifice	15%
grade 3	Golf hole orifice	10%

**Q: what is surgical compln of Augmentation?**

A:

- Hour glass contracture
- Mucous Blockage
- Neo Patch disruption
- Urinoma

**Q: what is “Rat-Tail” anastomosis?**

A: Anastomose ureters to sigmoid & the other end of sigmoid to bladder

- When ileum is not available due to G.I TB also
- Dis adv : Buckling of segment

**Q: What procedure will you do along with augmentation bladder?**

A: TUBNI: To decrease the outlet resistance and for easy CISC.

**Q: what will you use to augment if G.I TB is also there with GUTB?**

A: Use sigmoid

**Q: what are the Indn for Augmented cystoplasty?**

A:

1. Non compliant contracted Bldr
2. with upper tract deterioration,
3. With failed medical Mx
4. With capacity <100ml
5. With Symptoms frequency, urgency, nocturia, pain, hematuria

**Q: what is the Pre operative work, before augmentation cystoplasty?**

A: VCUG, IVP, Cystometrogram, cystoscopy

Urine culture

Urine AFB culture

Bladder mapping (rule out CIS)

**Q: what is the most common organ used for Augmented cystoplasty?**

A: Ileum (Pre –terminal ileum)

**Q: why do you want to use pre-terminal ileum and not terminal ileum?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A: because terminal ileum plays an important part for absorption of bile juices, so last 20 cm of ileum is spared and pre-terminal ileum is used for bladder augmentation.

**Q: what are the metabolic complications of augmented Bldr?**

- Electrolyte disturbance
- Mucous prodn
- Growth retardation
- Osteomalacia
- Infection
- Calculus / stone
- malnutrition Tract cutting / small bowel syndrome
- Cancer

**Q: what is most common / presenting complication after Bladder augmentation?**

A: Diarrhea (due to ↓ bile acid / salt absorption)

Mx – cholestyramine. 4 mg OD/ BD

**Q: Does amount of Bladder resected has any relationship with final outcome in augmentation cystoplasty?**

A: Usually No

**Q: how will you fl/up a pt of augmented bladder?**

A:

- before Discharge → Teach Voiding in sitting position & Pelvis Relaxation  
If PVR > 10% of bladder capacity → teach CISC  
Teach giving bladder washes
- Cystogram @ POD 14 or 21 with SPC removal  
Baseline creatinine/CBC/Electrolytes
- Fl/up @ 1 month USG, PVR, Creat / CBC/Elect.
- Review fl/up @ 3,6,12,18,24,36 months, add vit B12 , folic acid after 3 yrs.
- Fl/up sos if fever / N / V / Anorexia/ fatigue

**Q: What are adv/ dis adv of ileocystoplasty?**

A:

Adv: Low pressure system, Good reservoir

Dis adv:

- Metastatic complications,
- stone
- Progressive Azotemia
- Ureteric stricture
- Renal calculi

late complication

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the voiding pattern after sigmoid cystoplasty?**

A: double void – 1st – original bladder void  
-2nd – sigmoidal contraction

**Q: what are the specific complications of sigmoido-cystoplasty?**

A: specific compln of sigmoido-cystoplasty

- Chronic cystitis
- Persistent dysuria,
- frequency
- Metabolic complications

**Q: what is Caeco-cystoplasty?**

A:

- Use of caecum with I/C valve as bladder cap
- Adv: I/C valve prevent reflux
- pre requisite  
AS much as Bladder should be preserved  
Anastomosis diameter  $\geq 5$  cm
- voiding pattern after caecoplasty Requires  
CISC  
Credes maneuver  
Valsalva  
Abdominal muscles  
TUBNI is sometime necessary for good out flow

**Q: what are the adv & indn ileo-caeco cystoplasty?**

A:

Indn:

- More severely contracted /diseased Bladder where all but Trigone is removed
- Usually accompanied by anti-reflux opn

Adv:

- In case of pouch failure, the ileal segment can be exteriorized without disturbing original uretero-ileal anastomosis.
- Ileal segment length can be used for ureteral placement (as in strudder's)

**Q: what is the standard reconstruction method?**

A: Augmentation

**Q: describe clam cystoplasty?**

A:



## **Neeraj Sharma's ...Notes For Urology Practicals**

- Devised by Goodwin
- Clam means shell / cap/ Muslim cap

### **Procedure**

- Lay open bladder in sagittal (antero-posterior) plane, avoid going too deep in ant & posterior bladder
- Secure the two "V" by figure of eight suture
- Secure the lateral halves to lateral pelvic side walls
- Take 40 cm ileum (20 – 40 cm) (after leaving 15 cm pre-terminal ileum)
- Ensure & check that it reaches pelvis
- Resect this segment
- Reconfigure in 'U' shaped / 'S ' shaped
- Invert over & suture to bladder.

**Compln** : hour glass contracture

**Adv**: No need of ureteric reimplantation  
No disturbance to bladder neck.

**Q: why do we need orthopedic neobladder then?**

A: indn:

1. Tubercular Thimble Bladder  
Capacity  $\leq$  15 ml with severe LUTS + supra pubic pain

As an alternative to augmentation cystoplasty is an attempt to completely eliminate diseased / fibrosis bladder

Adv:

- Completely removes source of symptoms
- Permits anastomosis to healthy urethra
- Addresses lower ureteric pathology at same time (e.g. Reflexive/golf holed /strictured)
- Possibility of Hour-glass contracture diverticularization & spontaneous rupture is avoided
- VUR Rx as same time

Compln

- All metabolic compln of orthotopic neobladder
- Anastomotic stricture
- Hyper continence (difficult emanation)
- PVRU
- Need for catheterization

**Q: what are the chances for +ve Cysto-Biopsy for TB?**

A: 20-40% (+ve)

- Biopsy should be done when in doubt

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What is cavernostomy?**

A: The draining of tuberculosis abscess through skin (via PCN dilation) and then delivering the drug (Pyrazinamide) directly into abscess cavity. (in short I & D of tuberculosis abscess cavity) (reff. checked on Google).

.

### **Q: What will you do for prostate nodule?**

A: TRUS + Biopsy (even if PSA is low)

### **Q: If TRUS show prostatic abscess?**

A: Aspirate for smear & culture

### **Q: what is the normal weight of prostate in GUTB Pt?**

A: Less than age matched control

### **Q: What will you specifically ask in a pt who has a beaded Vas/epididymis?**

A: Ejaculatory volume.

### **Q: What are the complication/ consequences of granulomatous prostatic abscess?**

A: Wide prostatic fossa with contracted bladder

With +/- urethral stricture

With prostatic abscesses giving moth eaten appearance can VCUG / MCU (due to multiple cavities)

### **Q: How does abscess change in physical consistency after AKT?**

A:

- Caseous material in early stages
  - Clear fluid after AKT
- } on USG

### **Q: how will you manage a TB Prostatic abscess?**

A: Trans Urethral Drainage

### **Q: How will you manage MTB urethral stricture?**

A: Deploy SPC + stent AKT

Definite management at a later stage

### **Q: what are the indn for Sx for genital TB?**

A: Epididymal abscess

Testicular abscess

### **Q: How will you manage epididymal abscess?**

A: Epididymectomy





***Neeraj Sharma's-***

**NOTES FOR UROLOGY PRACTICALS**

***PUJ<sup>n</sup> obstruction***

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**PUJ<sup>n</sup> obstruction**

**(Q) How will you define PUJn obst<sup>n</sup>?**

(A) PUJ<sup>n</sup> obstruction is the functional significant impairment of urinary transit from renal pelvis to ureter.

**(Q) What is the etiology?**

(A) 1 (primary) mostly congenital / aperistaltic segment/ loss of spiral musculature

2 (secondary) acquired – extrinsic compression (crossing vessel)

Stone disease

Post op stricture (adhesions)

Post inflammatory (TB)

TCC upper tract

VUR (secondary pujo)

**(Q) What is the pathogenesis of PUJn obst<sup>n</sup>?**

(A) 1 Aperistaltic segment

2 kink valves (Ostlings folds)

3 crossing vessel

4 acquired – VUR, polyp, stone

5 External adhesions @ PUJn

**(Q) In what % of PUJn obstn cases lower polar vessels are seen?**

(A) 40 to 63% (Quillin et al)

**(Q) What can be the patient presentation?**

(A) In the embryonic life – USG diagnosed

In the neonatal - palpable mass

Infant - vomiting

- Failure to thrive

- ↑ creatinine, ↓ u/o

- Asymptomatic

In adults: - incidentally

Flank pain, abd pain

Abd mass

## **Neeraj Sharma's ...Notes For Urology Practicals**

Azotemia  
Hematuria, pyuria, fever  
HTN

**(Q) What is the usual age of presentation?**

(A) 20 – 40 yrs

**(Q) What is the m/c presenting feature in adults?**

(A) Adults are usually symptomatic  
Present with intermittent flank pain  $\pm$  n/v  
Hematuria  
HTN

**(Q) What is the D\D of PUJn obstn?**

(A)

- Stone disease
- Ureteric stricture inflammatory
- Urothelial neoplasm
- Ureteric folds / kinks

**(Q) What is the m/c cause of PUJn obstn?**

(A) Congenital

**(Q) Why this congenital problem will present @ 35-40yr of age ?**

(A) Causes of pain in PUJn @ adulthood

- Infn / UTI
- Secondary stones
- Trauma
- Change in collagen composition of renal pelvis
- renal capsular stretch

**(Q) Why is there pain in HN/HUN?**

(A) -capsular stretching  
-cytokines released due to urothelial stretching

**(Q) What Ix are required**

- 1<sup>ST</sup> line.... CBC, RFTs, urine routine, urine culture (sos) Xray-kub, usg-kub,
- 2<sup>nd</sup> line.... IVP/ CECT KUB
- 3<sup>rd</sup> line.....DTPA

**(Q) What do you expect in urine routine examination?**

(A) RBC ++ (micro hematuria) }  $\pm$  proteinurea  
Pus cell ++ (pyuria) } if kidneys are affected.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **(Q) What are the classic signs on IVP?**

(A) Dilated pc system + delayed contrast clearance + normal caliber ureter or non visualization of ureter

### **(Q) What is diuretic urography?**

(A) Diuretic @ the start of ivp study just before injecting contrast (after scout film) puts the renal system at stress and delineates obstruction better. (Lasix -0.5mg/kg.)

### **(Q) What will you do if diuretic IVP/IVP doesn't show any fn ?**

(A) Do diuretic –nuclear scan (renography) preferably MAG-3 or EC.

If IVP is not showing function that means GFR of that kidney is severely low, in such cases DTPA renal scans give false reports as DTPA is a glomerular agent. So MAG-3 or EC is advisable

### **Q. which is your choice IVP or CECT KUB?**

A. CECT KUB because

- Patient preparation is not required in CECT, sometimes IVP is not done due to bowel gas.
- No need of early morning schedule ,overnight fasting, dulcolex ,divol,etc
- Kidney anatomy can be seen even in absence of kidney fn, which is not possible in IVP
- renal parenchymal thickness is seen in CECT KUB
- crossing vessel/any other external compression is seen in CECT KUB
- Ureters are better seen in CECT than IVP
- Ureteric mass (if any) will enhance
- This is a one-time operation so radiation exposure of CECT does not matter much.

### **(Q) How will you differentiate b\w cystic kidney &hydronephrotic kidney in USG?**

(A) Hydronephrotic HN kidney the dilatation / hypoechogenicity is in the centre.

Polycystic kidneys have multiple cysts all over.

### **(Q) What are the functional tests to assess PUJn obstruction and to assess kidney fn?**

(A).

- <sup>99</sup>Tc –DTPA,MAG-3,Diuretic renography
- Whitaker test
- MRI
- IVP / C.T urogram (GFR -20-30ml/min)

### **(Q) If a kidney is showing contrast excretion in IVP, what is its function?**

(A) Atleast 20% - 25 % fn is required for seeing a urogram in IVP



## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) What is the best contrast media for IVP ?**

(A). non ionic iso osmolar

**(Q). how much contrast will you inject for IVP?**

(A) 1 ml /kg body weight, max-100 ml.

**(Q) Describe IVP procedure?**

(A).

- Check Sr. creatinine
- Ask for any contrast allergy
- Take plain x-ray KUB supine (check bowel preparation)
- Establish I.V. line
- Do intra-dermal contrast test dose
- explain the patient that feeling of warmth and flushing will be observed at the time of contrast injection
- inject contrast @ 1 ml/kg
- 5 min film-----nephrogram and PC system
- 10 min film-----ureters
- Schedule the next films as per need
- Take a full bladder film
- Take a post void film

**(Q) What is a delayed film?**

(A). 4<sup>th</sup> hour and beyond films are known as delayed films.

### **While reading an IVP series in exams**

- ✓ plz do not read out film by film
- ✓ study the complete series and then speak
- ✓ read out the plain film like....the plain film taken from T-10 to lesser trochanter of femur bones and soft tissue shadows appear normal, no radio-opacity seen in KUB region
- ✓ never comment that it is a poorly prepared IVP series
- ✓ Read the normal kidney first like .....right kidney shows good uptake and prompt excretion of contrast with no dilatation of PCS. Ureter can be traced upto bladder .
- ✓ now comment upon the abnormal unit ,
- ✓ Bladder and post void films to be described last.
- ✓ Be ready to hear "what do want next?" make a plan ...pyeloplasty v/s DTPA

**(Q). what do want next?**

(A) Pyeloplasty

## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) Is DTPA or renal nuclear scan going to change your plan of management ?**

(A). no, but it is done to know the precise function, I will explain the patient ,if he wants to know the precise function then I will do it .

**(Q) What is the choice of Ix for fn study?**

(A) Diuretic renography MAG-3

B'coz MAG-3 has total tubular secretion so not affected by GFR.

In most centers, mercaptoacetyl triglycine (MAG3) has replaced diethylenetriamine pentaacetic acid (DTPA) as the radionuclide of choice

**(Q) What is the difference between DTPA and MAG-3?**

(A).

- MAG3 is both filtered and secreted by the renal tubules, it is more useful in immature or chronically insufficient kidneys than is DTPA.
- DTPA is filtered only by the glomerulus and is not actively secreted by tubules

**(Q). How to read a given renal nuclear scan**

(A). There are three parts of a given renal nuclear scan

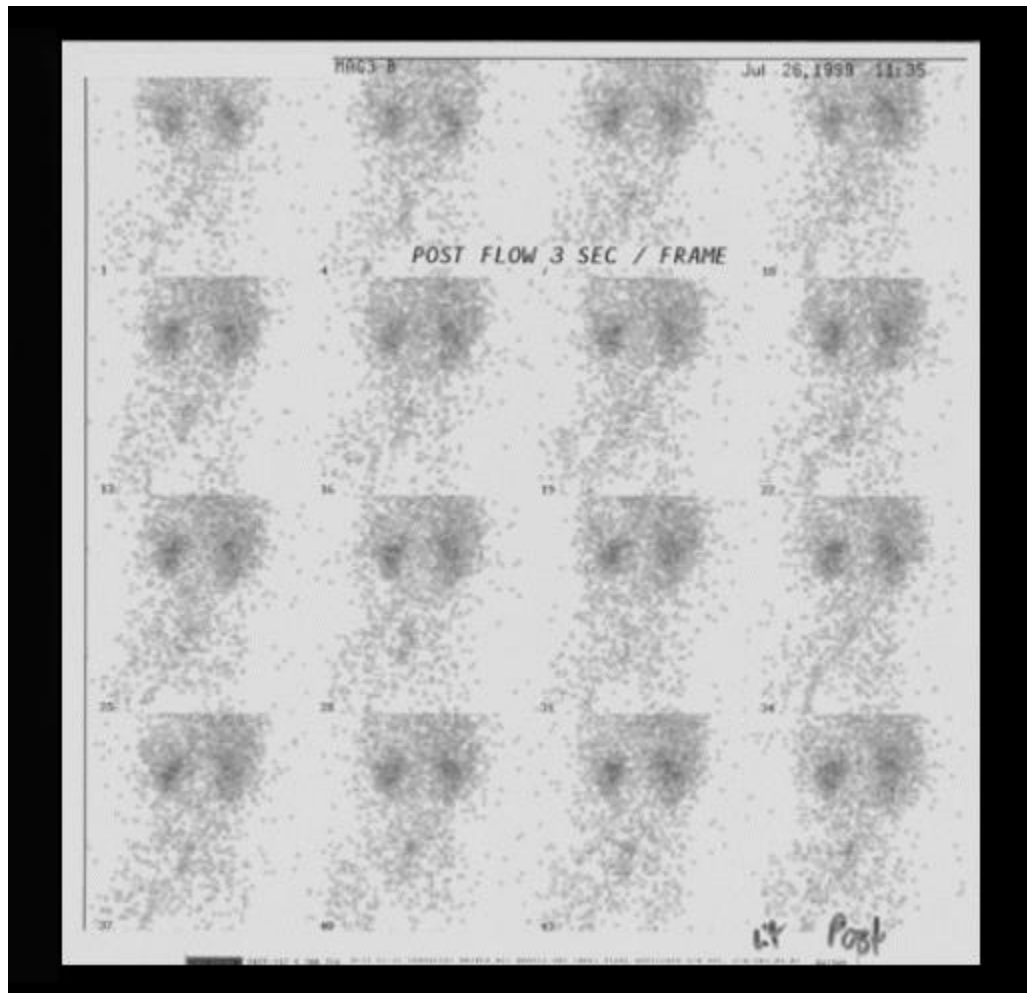
1. The picturistics/ images of the kidneys
2. The graphical representation/curve
3. The numerical values.

### **The picturistics/ images of the kidneys**

The images given are actually 2 sets of images 1<sup>st</sup> one represents the perfusion phase and images are taken @ 1 image per sec after injecting contrast. Contrast usually reaches both kidneys simultaneously

## **Neeraj Sharma's ...Notes For Urology Practicals**

and within 5 seconds .thus both kidneys should be seen together after 5 second image.

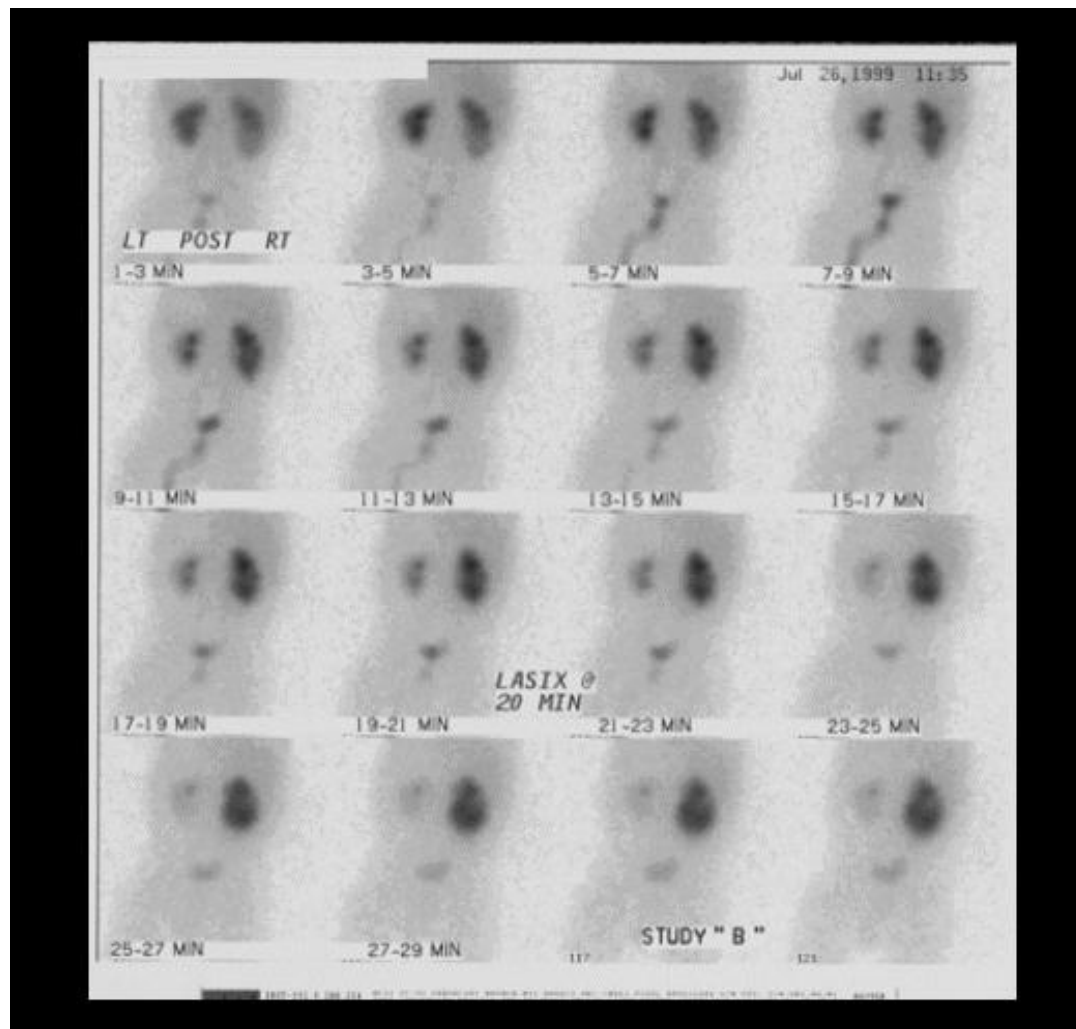


Renal mercaptoacetyl triglycine (MAG3) study in a patient with right ureteropelvic junction obstruction. Initial blood-flow images demonstrate normal perfusion to the kidneys

The second set of images are taken @ 1 image per min and represent intra renal transient time and excretion of contrast into PC system and reaching bladder.

Usually intra renal transient time (IRT) is less than 4 min so contrast should be seen in PC system by 5 images. Delay in IRT represents obstruction.

Rest of the images represent the flow of tracer from PC system to bladder.

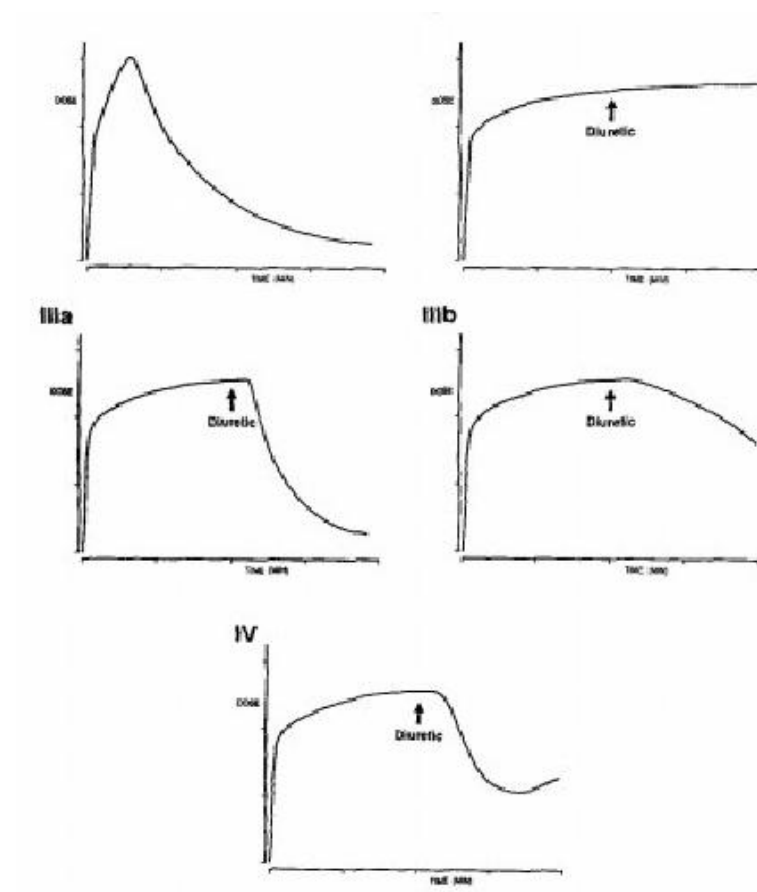


Postero-anterior renal scan in a patient with right ureteropelvic junction obstruction shows normal uptake and excretion of radiotracer from the left kidney into the left ureter and bladder (and out of the Foley catheter). The progressive uptake of contrast material into the right renal collecting system without excretion is consistent with proximal obstruction.

#### **The graphical representation/curve**

The curve represents the graphical presentation of the tracer movement across the renal system .the graphs are called **O'REILLEY CURVES or time activity curves.**

Each graph has three lines 1<sup>st</sup> for aortic trace, 2<sup>nd</sup> and 3<sup>rd</sup> for the left and right kidneys.



Curve	Pattern	Inference	Suggested treatment
<b>Type 1</b>	Rapid peak + fast downsloping curve	Good uptake, rapid excretion, normal kidney	nothing
<b>Type 2</b>	Rapid peak + continue upsloping curve	Good uptake ,with hold up of contrast, obstructed kidney	Operative management
<b>Type 3 A</b>	Rapid peak + continue upsloping curve +rapid fall after diuretic	Un obstructed kidney but requires pressure assistance for clearance	Close follow up  Repeat study after 6 months .intervene if function deteriorates by more than 10 %
<b>Type 3 B</b>	Rapid peak + continue upsloping curve +SLOW fall after diuretic	OBSTRUCTED with slow clearance	Operative management

## **Neeraj Sharma's ...Notes For Urology Practicals**

<b>Type 4</b>	Rapid peak + continue upsloping curve +rapid fall after diuretic+ again up rising curve	Un obstructed kidney but requires pressure assistance for clearance .	Operative management
		Second peak is due to accumulation of contrast again. clearance is slower than accumulation	

### **The numerical values.**

The third part of the report is numerical values

Concentrate on the GFR, IRT,  $T_{(max)} \frac{1}{2}$  and split function .

### **(Q). How is GFR calculated in nuclear scans?**

**(A).** Advances in nuclear medicine methodologies provide the opportunity to assess renal function (GFR, ERPF and MAG3 clearance)

- Using either plasma sample clearances or camera-based methods.
- Plasma sample clearances involve blood sampling.
- Camera-based techniques do not require blood or urine samples to measure GFR, ERPF or a MAG3 clearance, but these measurements are not considered to be as accurate as plasma sample techniques and require specialized software

### **(Q) Describe the pharmacokinetics of MAG-3?**

**(A).**

- MAG3 is the most commonly used renal radiopharmaceutical in the United States.
- After intravenous administration, about 40–50% of the MAG3 in the blood is extracted by the proximal tubules with each pass through the kidneys; the proximal tubules then secrete the MAG3 into the tubular lumen.
- MAG3 has a much higher extraction fraction than DTPA ; consequently, it is a better diagnostic agent than  $^{99m}\text{Tc}$ -DTPA, particularly in neonates, in patients with impaired function and in patients with suspected obstruction.
- The MAG3 clearance is highly correlated with the effective renal plasma flow (ERPF), and the MAG3 clearance can be used as an independent measure of renal function.

### **(Q) Describe the pharmacokinetics of DTPA?**

**(A)**

- DTPA is the second most commonly used renal radiopharmaceutical in the United States primarily because it is the least expensive.
- Technetium- $^{99m}$ -DTPA is filtered by the glomerulus and may be used to measure the glomerular filtration rate (GFR).

## **Neeraj Sharma's ...Notes For Urology Practicals**

- The extraction fraction of  $^{99m}\text{Tc}$ -DTPA is approximately 20%, about half that of MAG3.

**(Q) In how much time the lasix starts working?**

(A) Effect starts within one minute, peak reaches @ 15 min.

**(Q) What is the effect of lasix on GFR measurements in nuclear scans?**

(A) No effect, lasix is a loop diuretic, does not affect GFR measurements

**(Q) What is the status of diuretic renography in PUJn obstr Mx?**

(A) Mandatory in every case of PUJn obstr

**(Q) Will you do plain renography or diuretic renography?**

(A) If PUJn obstr is suspected then straight away diuretic renography (gold std)  
No need for plain renography.

**(Q) Which isotope will you use?**

(A)  $^{99m}\text{Tc}$ -m, MAG-3, EC

**(Q)  $^{99m}\text{Tc}$ -MAG-3,  $^{99m}\text{Tc}$ -EC and  $^{99m}\text{Tc}$ -DTPA = what does "m" stand for?**

(A) Metastable.

**(Q). what are the various diuretic renogram protocols?**

(A).according to the timing of Lasix administration: There are three variations.

- F + 20 - Furosemide is injected 20 minutes after the injection of tracer.
- F (- 15) - Furosemide is injected 15 minutes prior to the tracer
- F - 0 - Furosemide is injected at the beginning of the study.

**(Q) Out of the above protocols which one will you choose for PUJn obstr?**

(A) ideal is F +20 because

- Unnecessary Lasix inj<sup>n</sup> is avoided if kidney is well draining already.
- Lasix is given if needed
- Under routine life patient's kidney is not under stress of Lasix

**(Q) Out of the above protocols which one is usually done practically for PUJn obstr?**

(A) Most nuclear physicians perform F-0 protocol because

- Most of these are busy units and re performing the study after Lasix is time consuming
- In children, single time injection of contrast and Lasix is more practical and convenient
- A bit of Lasix stress on kidney is beneficial to select obstructed systems
- Studies have proven that there is no difference in results of renogram, whether F-15, F-0 or F+20 protocol is chosen, what matters most is the Lasix administration and not its timing.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) Is there any need to do Sr. creatinine before nuclear renogram ?**

(A) DTPA is glomerular agent .with rise in creatinine GFR decreases .so values of dtpa scan will be fallacious.

Renal scan in altered creatinine: Use tubular agents

DTPA can be done upto 3.0 mg/dl

DMSA and MAG-3 can be done upto 7 mg/dl

**(Q) What is the criteria of “non salvageable” kidneys on renal scan?**

(A) Less than 15% differential function and less than 10 ml/min of GFR

If the salvagability is still unclear, then Deploy a DJ stent/PCN and repeat renal scan after 6 wks

❖ **Readers are requested to read the following article on internet**

### **GUIDELINES FOR STANDARD AND DIURETIC RENOGRAM IN CHILDREN**

**Under the Auspices of the Paediatric Committee of the European Association of Nuclear Medicine**

By Isky Gordon, Paula Colarinha

**(Q). how is Whitakers test done?**

(A).

- deploy a foleys catheter in bladder and a PCN needle in the in renal PC system
- Deploy a pressure transducer and infusion line (these both may be co-axial or separate units
- Set zero calibration of pressure transducer
- Start infusing saline @ 10 ml/min and measure the pressure in pressure transducer after 5 minutes.

10-15 cm H<sub>2</sub>O.... unobstructed

15-22 cm H<sub>2</sub>O – inconclusive

>22 cm H<sub>2</sub>O .... Obstructed

**(Q). What is the status of Whitakers test now a days?**

(A) It is an obsolete test .....no one does it .

**(Q) How does MRI depict PUJn obstruction?**

(A).calculate T ½ in MRI

MRI- T ½

- Less than 4 min =normal
- 4-8 min = equivocal
- More than 8 min =obstn



## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) What is kaff's classification of PUJn obstruction?**

(A)

- Volume dependent → PUJn obstruction appears with fluid binge, (intrinsic PUJn )
- Pressure dependent → Due to external compression.

**(Q) What are the ind<sup>n</sup> for Di stenting preop?**

(A) Acute decompression required

For dilation of ureter (for retrograde endopyelotomy)

**(Q) What are the ind<sup>n</sup> for PCN preop?**

- Severe obstructed system (pt c fever\sepsis\not fit for GA)
- Thick pyuria (depicted by debris in usg)
- Kidney non fn in IVP
- Failure to DJ stent.

**(Q) What will you do if a pt presents with suspected PUJn obstruction with sepsis, i.e. ↑RFTS and CBC?**

(A) Decompress the system

Deploy usg guided PCN

**(Q) Why PCN?**

(A) – Can be done ↓ L/a

- USG guided--no radiation / no lithotomy
- large bore tube can drain the pus better
- depicts the isolated function/urine output of affected kidney
- antegrade studies can be done

**(Q)What are the indications for intervention in PUJn obstruction?**

- UPJO with symptoms (pain, nausea ,vomiting)
- Impairment of overall renal fn
- Impairment of ipsilateral renal fn
- ↓ in fn by 10% in fl/up study
- Stones, pyuria

**(Q) How will you counsel the pt of PUJn obstruction about need for surgery?**

(A)-will prevent renal damage

- renal damage will not recover but will stop further deterioration after sx
  - secondary stones
  - inf<sup>n</sup>
  - Pain / symptoms
- can be prevented

## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) What are the success rates for open & endoscopic procedures?**

(A) Open  $\geq 90\%$

Endoscopic  $\geq 75 - 80\%$

**(Q) What is the minimum fn required for kidney salvagability & endoscopic procedure?**

(A) 15% minimum for kidney salvagability

25% minimum for endopyelotomy

**(Q) What is diet's crisis?**

(A) Severe acute attack of abd pain, nausea, vomiting (n/v) a/w increased output of urine which distends renal pelvis

**(Q) What congenital anomalies are associated c PUJn obstn?**

(A)

- Opposite side PUJn obstruction (10-40%)
- VUR (low grade) (5-20%)
- MCDK
- renal dysplasia
- renal agenesis
- imperforate anus
- VATER abnormalities

**(Q) What is upper tract urodynamics?**

(A) Whitaker test (1973)

**(Q) What are the indn' for intervention in PUJn obstruction?**

(A)

- Symptomatic pts (mostly all adults symptomatic)
- Deteriorating renal function
- Stone /infection

**(Q) What is Jabbar's statement (1998)?**

(A) It is appropriate to recommend;-

- endo urological sx after failed open/ lap pyeloplasty
- Open \ LAP pyeloplasty after failed/endourological sx.

---

**Percut, antegrade endo-pyelotomy (A.E.P)**

**(Q) Who described it?**

(A) Ramsay's –antegrade endo-pyelotomy

Badlani – propagated it

**(Q) What & where is the cut?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

(A) Full thickness, lateral incision upto peri-pelvic fat (postero-lateral)

**(Q) What are the ind<sup>n</sup> / contra-ind<sup>n</sup> for antegrade E.P?**

(A) Indn –symptomatic pt, HTN, stone,

- kidney stones
- previously failed open pyeloplasty
- small <2cm PUJn stricture

C/indn →

- long segment >2cm
- crossing vessels
- Distal obstruction
- non-dependent PUJn
- severely /grossly dilated pelvis
- active infection

**(Q) Describe the technique antegrade Endopyelotomy?**

- Cysto +RGC +RGP +Foleys catheterization
- Turn prone & PCN puncture
- Deploy Guide wire & safety guidewire
- Postero-Lateral full thickness cut
- Deploy Endopyelotomy stent 14/7 fch + nephrostomy tube

**(Q) When will you remove tubes nephrostomy and Stent?**

(A)Foleys removal → pod-1

Nephrostomy removal: after-48 hrs

Stent removal:- after 6wks

**(Q) How will you fl/up?**

(A) Stent removal @ 6wks

6wks after stent removal → phy. exam

Urine analysis

DTPA/MAG -3

after 6 wks of stent removal

Fl/by 6mo, 12mo, 24mo, 36mo

-most of the failures are within 3yrs

**(Q) What is the success rate of endopyelotomy?**

(A)In properly selected patients around 70 -75%

**(Q) What are the compl<sup>n</sup> of endopyelotomy?**

(A)

- Bleeding
- hemorrhage

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Infn
- Persistent obstruction
- All compl<sup>n</sup> of pcnl

### **Retrograde (ureteroscopic) endopyelotomy (REP)**

**(Q) What are the advantages of REP?**

(A).

- Direct visualiz<sup>n</sup> of PUJn
- No need for pcnl & its morbidity
- Cost benefit
- Less morbidity

**(Q) What are the c/indn of retrograde endopyelotomy?**

(A) 1 Long stricture >2 cm

2 renal stones

3 very large HN → large pelvis requiring reconstructions

4 non dependent PUJn

**(Q) Describe the technique?**

(A)

- Cysto + RGC + RGP +guide wire across PUJn
- Semi rigid ureteroscope +200 micron holmium laser
- joule 10 Hz setting (remember in laser settings 1 joule = 10 Hz)
- Fire the laser.
- Inject contrast through the side channel and check by extravasations
- Deploy stent over the guidewire.

**(Q) What are the results of REP?**

(A) 80% success in properly selected patients.

### **Open/lap pyeloplasty**

**(Q) What is the status of RGP?**

(A) RGP must be done before pyeloplasty (not to be done in pediatrics)

- To be done on table
- Helps in delineating distal ureter patency, especially if not seen in IVP
- Helps in making incision level
- Confirms the diagnosis

**(Q) What is hydronephrotic drip?**

(A) While doing cystoscopy + RGC, as soon as the RGC crosses the obstructed PUJn, urine drip starts at the surgeons end of RGC. This drip is called hydronephrotic drip. This was of relevance in era when RGC was deployed blindly without IITV. This hydronephrotic drip makes sure that RGC has reached into renal pelvis.

**(Q) Would you like to keep this RGC in situ after RGP as it may help in identifying ureter?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

(A) no, because it will empty the pelvis and make renal pelvic dissection difficult.

### **(Q) What are the principles of pyeloplasty repair?**

(A) Principles of pyeloplasty repair are

- Mucosa to mucosa, water tight anastomosis
- Tension free anastomosis
- Well dependent PUJn
- funnel shaped pelvis
- straight ureter

### **(Q) What are the adv &disadv of Anderson Hyne dismembered pyeloplasty?**

(A) ADV:-universally applicable

Regardless of the ureteric insertion

Possible reduction of redundant pelvis

Aberrant lower polar vessels can be dealt with

DISADV:-the procedure is very difficult in

1 intra renal pelvis

2 long stricture

### **(Q) What do you do before dismembering the PUJn?**

(A) Marking and stay sutures one lateral on ureter &atleast one on kidney (usually two stay sutures on kidney pelvis.

### **(Q) What is modified Anderson Hyne dismembered pyeloplasty?**

- Kuster's originally described the dismembered procedure
- Nesbit modified it by creating an elliptical anastomosis to decrease the likelihood of stricture formation at the site of repair.
- In 1949, Anderson and Hynes described their modifications of this dismembered technique that involved anastomosis of the **spatulated ureter** to a projection of the lower aspect of the pelvis after a redundant portion was excised. Anderson Hynes (1949): The pelvis is cut in elliptical shape. No stent, continuous suturing
- Modified Anderson Hynes: The pelvis is cut in diamond shape and redundant pelvis is excised, interrupted suturing. Stent kept. Anastomosis over a **DJ stent** is modified Anderson Hyne dismembered pyeloplasty

### **(Q) In A-H pyeloplasty where will you spatulate the ureter?**

Blood supply of upper ureter is from medial aspect. Put marking suture on the lateral aspect just below the narrowed segment and spatulate laterally

### **(Q) What suture is recommended for pyeloplasty?**

(A)

- In adults use PDS 3-0 ,4-0

## **Neeraj Sharma's ...Notes For Urology Practicals**

- -In children use PDS 5-0

### **(Q) What is the suturing technique you do?**

(A) Classically interrupted suturing described but it increases chances of leak, so practically go for continuous suturing without interlocking

### **(Q) How will you make sure that anastomosis is tension free?**

(A) The cut ends (or free ends) of pelvis and ureter should overlap by 1 cm

### **(Q) Suppose after transecting the PUJn segment, you feel that the cut ends are too far, then what will you do?**

(A) Following things should be done...

- Try to mobilize the ureter more upwards
- Free the upper pole of kidney and try to mobilize the kidney downwards
- Always keep stent and drain in such cases
- Davis intubated pyeloplasty with healing with secondary intention

### **(Q) Suppose after completing the pyeloplasty, you feel that the anastomosis is in tension, then what will you do?**

(A) Dissection and mobilization of ureter and kidney

Making a few multiple small cuts on the convex border of pelvis and thus relieving tension

### **(Q) What is splash pyeloplasty?**

(A) When the anastomosis is in tension, making a few multiple small cuts on the convex border of pelvis and thus relieving tension is known as splash pyeloplasty. These renal pelvis defects heal by secondary intention.

### **(Q) Do you remove drain first or foleys first?**

(A)

- Mucosal healing takes place in 72 hours so ideally drain output should be negligent after 72 hrs ,so drain is removed first.
- Stent causes reflux in PC system and foleys prevent reflux. So after 24 hours of drain removal, if patient is asymptomatic then remove foleys and discharge the patient.

### **(Q) When will you remove DJ stent?**

(A) After 6 weeks

### **(Q) What are relative ind<sup>n</sup> & c/ ind<sup>n</sup> of foleys Y-V – Plasty?**

(A) ind<sup>n</sup> suitable for high ureteric insertion

c/ ind<sup>n</sup> :- can't be done when

1 lower polar vessels are there

## **Neeraj Sharma's ...Notes For Urology Practicals**

2 huge renal pelvis

**(Q) What are the ind<sup>n</sup> \contra- ind<sup>n</sup> for spiral Culp flap?**

(A) Ind<sup>n</sup>: - huge pelvis with upper proximal ureteric stricture or long PUJn obstn  
PUJn should already be in dependent position

**(Q) What are other open sx?**

(A) Scardino prince open vertical flap  
Davis intubated ureterotomy  
Ureterocalycostomy

**(Q) Describe uretero -calycostomy?**

(A) Ind<sup>n</sup> :PUJn obstn +  
Dilated lower calyx +  
scared renal pelvis  
Or intrarenal pelvis

- chop the lower pole of kidney
- Uretero-calyceal anastomosis done in open fashion over stent
- close renal capsule
- put nephrostomy & drain

**(Q) What is Hellstorm operation?**

(A) In hellstorm operation, reduntant pelvis is wrapped around the crossing vessel and the crossing vessel is tucked away from the PUJn , so that it no more compresses the PUJn.

**(Q) What is nephroplication?**

(A) When the obstructed kidney is too large that efficient urine drainage is doubtful nephroplication is done. Three ribbon like sutures are taken in vertical axis from upper pole to lower pole, one through the anterior surface ,one through the lateral border and one through the posterior surface .when tightened these stitches lead to plication of kidney

**Q) If a patient has both, suspected PUJn obstruction and stone, how will you decide that whether it is the PUJn obstruction causing stone or stone causing PUJn obstruction?**

(A)

	<b>PUJn obstruction causing stone</b>	<b>stone causing PUJn obstruction</b>
<b>Stone features</b>	Smooth , round,	Any type of shape, spiculated rough surface,
<b>Stone number</b>	Multiple	Usually single

## **Neeraj Sharma's ...Notes For Urology Practicals**

<b>Stone location</b>	Lower calyx	Impacted at PUJn
<b>Kidney parenchyma</b>	Usually thinned out to variable extent	Comparatively healthy renal parenchyma
<b>Kidney PCS dilatation</b>	More	Less
<b>Patient presentation</b>	Less acute, chronic dull pain	Variable, may be acute, with nausea vomiting.

### **(Q) How will you manage when you are in doubt whether it is the PUJn obstruction causing stone or stone causing PUJn obstruction?**

(A) 1<sup>st</sup> I will do PCNL remove the stone and at that time see the PUJn ...if no PUJn odema ,no impacted stone then endopyelotomy can be done in same sitting.

If stone is impacted at PUJn or odema at PUJn, then complete pcnl, deploy a stent and come out .Re-evaluate for PUJn obstruction after a few days.

### **(Q) Surgical procedure and various bridging length**

(A) Uretero – ureterostomy direct	2-3cm
Ureteroneocystostomy	4-5cm
Kidney descent	4-5cm
Psoas hitch	5-10cm
Boari flap	10-15 cm

### **(Q) What is the fl/up protocol after open pyeloplasty?**

(A)

- 1<sup>st</sup> follow up- for Stent removal after 6wks
- 2<sup>nd</sup> follow up- DIURETIC RENOGRAM after 6 wks of stent removal.
- Some centers do usg after 6wks of stent removal but some amount of residual hydronephrosis will be there so use of USG is controversial. This residual hydronephrosis may remain there for one year or so. Hence MAG-3 or DTPA is more appropriate.
- 3<sup>rd</sup> follow up after one year of surgery-only physical examination and history of being asymptomatic is usually sufficient. USG is done. If any time patient has loin pain or fever then call in between.

### **(Q) Can there be a drop in renal function on nuclear scan after doing pyeloplasty?**

(A) Yes, it is possible, the preoperative value of function may be falsely elevated due to large redundant pelvis and pooling of radiotracer .The post operative value is thus more accurate.

### **(Q) What are the compl<sup>n</sup> of open pyeloplasty?**

(A)

- bleeding,



## **Neeraj Sharma's ...Notes For Urology Practicals**

- Inf<sup>n</sup>,
- trauma, Urinary leak ,
- urinoma
- Inco operation of stent in stitch
- Re stricture of PUJn.

### **(Q) Is lysis of external PUJn bands sufficient?**

(A) No even after adhesionolysis; PUJn repair is needed, b'coz there is an aperistaltic segment.

### **(Q) What is the imp of high insertion of ureter?**

(A) Max-brodell theorem of high insertion of ureter- high inserting ureter can cause PUJn obstn

Needs foley's Y-V or Anderson hyne's pyeloplasty.

Usually it is a secondary phenomenon & not a primary cause.

Endoscopic Mx is contraindicated.

## **WELL TEMPERED RENAL SCAN**

A standard method has been agreed upon for the following facets of diuretic renography: patient preparation (hydration and bladder catheterization), diuresis renography technique (radiopharmaceutical used, patient position during examination, data acquisition parameters, diuretic pharmaceutical and dosage, time of injection and regions of interest to monitor diuretic effect), and data analysis (percent differential renal function, curve pattern analysis and methods of measuring diuretic response).

After adequate hydration, PUC in situ, standardizing the dose and time of administration of radiopharmaceutical agent

Hydration: In children fluid allowed as optimum. NS given (15ml/kg) over 30 min, beginning 15 min prior to study. Thereafter NS is continued at the rate of 200 ml /kg/24hrs throughout the duration of study

Adults: 500 ml fluid given 15 min prior to study

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## **LET'S REVISE**

-Definition of PUJn obstruction

-etiology of PUJn –primary ,secondary

-% association of PUJ<sup>n</sup> obstruction and lower polar crossing vessel- Quillin et al

-pt presentation

-age of presentation

-ix required –urine analysis, cbc, rft ,x-ray ,usg, ivp, dtpa

## **Neeraj Sharma's ...Notes For Urology Practicals**

- advantage of CECT V/S IVP.
- D/D of HN V/S cystic disease on usg
- fu study & its role in PUJO
- indn of doing dj stenting v/s pcnl
- indn for intervention in PUJn obstruction
- success rate of open u/s endoscopic procedure
- minimum kidney fn required for open/endo sx
- dietls crisis
- Percut ante grade endopyelotomy (PAEP)-Ramsay & Badlani
- indn for PAEP
- C/indn for PAEP
- Technique for PAEP
- Fl/up after PAEP
- Success rate of PAEP
- Compln of PAEP.
- Indn & c/indn for retrograde endopyelotomy REP
- technique, success & compln of REP
- Technique of open pyeloplasty
- detailed technique of Anderson hyne's pyeloplasty
- indn & c/indn for Foley Y-V plasty
- Uretero-calycostomy technique
- various techniques/steps for bridging ureteric gap
- fl/up protocol after open pyeloplasty
- compln of open pyeloplasty
- congenital anomalies a\w pujno
- m\c cause of pujno
- why pujno becomes symptomatic @ 30-40yrs
- why is there pain in pujno/hn/
- max brodell theory of high insertion of ureter
- relevance of max brodell theory
- m/c presenting features of pujno
- finding in urine analysis pujno
- signs of pujno in IVP
- diuretic renography

-

## ***Neeraj Sharma's-***

# **NOTES FOR UROLOGY PRACTICALS**

### *RPF- retroperitoneal fibrosis*

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#### **RETROPERITONEAL FIBROSIS**

Case : 50 years / ml, presented with C/o. left side abdominal discomfort since 6 months. Pain radiates to the groin

No c/o. fever, no other symptoms.

No c/o DM HTN

**Q. What are the causes of Left side abdominal pain ?**

**Ans.** Left side Renal mass, Renal stone, Renal Obstruction, Injury,

## **Neeraj Sharma's ...Notes For Urology Practicals**

Ureteric obstruction due to clot / stone

Retroperitoneal mass

Non Urological Causes

Rib pain, Pleuritis, herpes,

**Q What else you want to know in History?**

**A.** History of fever, History of Trauma, Drug History, Medical History, Surgical History, History of lithuria, Hematuria, History GIT disturbance.

Nil Contributory

On Exn – Gen Examn No. L.N.

No. Pedal Edema

No Pallor Icterus

Abdominal Examination – 10 cm left sided mass  
Ovoid shape, near Para umbilical region. Hard fix,  
does not move with Respiration, Non – Ballottable

L. Examn Testis-normal, – No Varicocele  
Penis-normal,

**Q. What is your clinical diagnosis?**

**Ans.** Pertaining to position / characters/ fixity/ midline features of the mass  
Retroperitoneal mass .. may be Tumor, lymph node ,Fibrosis  
Calcified Aortic aneurysm (rare)

**Q. How would you Ix this patient?**

**Ans.** Routine Blood / Urine Exn / CBC, Hb, ESR, RFTs ,  
Testicular Markers, CRP, Vascular Markers,  
USG Abdominal and Scrotum

**Q: What do you expect in these investigations?**

**A.** CBC – lymphoma, infective Leucocytosis  
Raised counts - infections  
ESR - acute / Chronic Pathology  
Urine - Urine analysis mirrors the Genito Urinary Symptoms  
Testicular Marker - In search of an extra testicular GCTs  
CRP - Acute Pathology

Values provided in this case ...

ESR – 80 mm/hr, RFTs – normal

USG – Retroperitoneal Hypo-echoic Para aortic, mass of 10 cm\*5 cm

## **Neeraj Sharma's ...Notes For Urology Practicals**

USG – Scrotum normal  
Testicular markers – normal

**Q. What Next?**

**Ans.** CECT – Abdomen  
Homogenous poorly enhancing mass surrounding aorta and IVC. Moderate Left HN.

**Q. What is your diagnosis now?**

**Ans.** Most probably a RPF

### RPF Etio-Pathology

**Q What is presenting mode of RPF?**

**A.** usually middle aged male  
(Age – 40 to 60 ,M/F = 3:1)  
Usually Having Chief complaints of Pain – which is Vague Abdominal pain involving flank, dull aching, unchanged with posture, may radiate to lower abdomen /loin.  
Pain is typically relived by “Aspirin” rather than narcotics.  
Other features are malaise, fever, oliguria, anuria

**Q What is most common level of RPF?**

**A** L4 – L5

**Q: What are the stages of RPF?**

**A:** Early - active - with T.Cell infiltration  
- Active fibroblasts  
- Immature fibrotic process  
Late -inactive - Fibrosed, Compact scar

### **What is the clinical presentation of RPF**

**Q:**

- Anorexia, weight loss

**A:**

- Low grade fever
- Poorly localized pain
- Azotemia, oliguria, features of obstructive uropathy
- Generalize abdominal pain
- 1 No extremity edema, DVT, scrotal swelling, varicocele

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Is ESR an Acute / or chronic phase marker**

**Q:** Acute phase marker

**A:**

**What is the normal value of ESR**

**Q:** Upto 10mm / Hr

**A:**

**What is CRP**

**Q:**

- C-Reactive protein

**A:**

- Acute phase marker

- Secreted by Liver

- Binds to receptors on surface to dead/ dying cells to start complement system Rn.

- CRP is a more sensitive and accurate reflection of the acute phase response than the ESR. ESR may be normal and CRP elevated. CRP returns to normal more quickly than ESR in response to therapy.

**What is normal value of CRP?**

**Q:** Less than 10 mg / litre

**A:**

**What are the Lab Tests will you do for Auto-immune diseases?**

**Q:**

1. Rheumatoid factor Test

**A:**

2. Antibody against smooth muscles

3. Anti nuclear antibodies (m/c test)

4. Anti 'Neutrophilic cytoplasm' antibodies (ANCA)

**What is the importance of Hb?**

**Q:** If Hb is more than 10 mg% then CKD/CRF is less likely

**A:**

**Q. What will you see in urine routine analysis?**

**Ans.** Microscopic hematuria and proteinurea

**Q: Why is there microscopic hematuria or proteinurea in RPF ?**

**A** Mass may compress IVC/ Renal vein leading to gross / microscopic hematuria and proteinurea

**Q. What do you look for in Gen Ex?**

**Ans.** Signs of IVC compression like Varicocele, Pedal Edema

Rule out general Lymphadenopathy

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What are the special blood tests for RPF?**

**Ans.** ESR, CRP, SLE, Vasculitis (ESR & CRP are raised in 80- 100% cases)  
Antinuclear antibodies  
Antibodies against smooth muscles  
ANCA- anti-nuclear cytoplasmic antibody  
Hyper gammaglobulinuria.

**Q: What is the method used to measure ESR?**

**A:** Westergreen (Better) (Long tube) (Vertical stand)  
Wintrobe

**Q: What is the principle Behind ESR?**

**A:** Rouleaux formation of RBC  
ESR reflects mainly the changes in plasma proteins fibrinogen & globulins  
More the fibrinogen & globulin & More in ESR  
ESR levels thus depict tissue damage degree of tissue damage

**Q Can serial measurement of ESR help?**

**A** Yes, Increase ESR → Worsening of Disease  
Decrease ESR → Cure of Disease

**Q: What is most important investigation for RPF Patient?**

**A** Sr. Electrolytes Status - Mandatory in guidelines  
Patient may have oliguria / Azotemia with raised Sr. K<sup>+</sup> and Ca<sup>++</sup>, which can lead to cardiac disasters

**Q: What are typical USG finding for RPF?**

**A** Bilateral HN ± H.U.  
Hypoechoic central mass lesion near vessels at the level of lumbar spine  
Homogenous mass

**Q. What are the USG findings suggestive of RPF?**

**Ans.** Retroperitoneal Mass – Hypo echoic mass :  
Mass centralized over abdominal great vessels and encasing them  
Vertically /longitudinally oriented mass  
see for ureteric involvement – HUN, HN,  
See for Bilaterality



## **Neeraj Sharma's ...Notes For Urology Practicals**

See for kidney size & renal parenchymal disease.

**Q. What are the findings on CT Scan?**

**Ans.** On CECT Scan  
Ring of Soft tissue mass around aorta & IVC  
Spreads to involve ureter.  
Fat plane between mass & psoas is usually lost  
RPF usually does not displace aorta anteriorly it encases the aorta  
Variable enhancement on contrast.  
Iso-dense with psoas muscle on plain studies.

**Q: What other conditions can cause encasement of vessels?**

**A:** Lymphoma  
Sarcoma  
Testicular malignancy

**Q. What are the features of RPF in IVP?**

**Ans.** Dilatation of PC system  
Medialization of Ureter  
Tapering of ureters distal to mass

**Q: What is the normal course of ureter?**

**A:** Ureter is roughly 25 – 30 cm long  
Ureter starts @PUJn  
Gonadal vein crosses over the ureter  
Ureter runs at the tip of transverse process  
Reaches upper SI joint ;  
Runs just lateral to SI joint  
Ureter crosses over the bifurcation of common iliac artery.  
Ureter then courses out to ischial spines and then turns medially to enter bladder base

**Q. At what level the ureteric Medialization occurs?**

**Ans.** L3 – L4  
L3 – corresponds to lower pole of kidney

**Q. What is usually the extent of mass?**

**Ans.** From Renal hilum to aortic bifurcation, may also extend upto common iliac bifurcation.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What are the levels of aortic and iliac bifurcations?**

**Ans.** L-4..... – Aortic bifurcations  
Iliac bifurcation at the level of Pelvic Brim ; in front of S.I. Joints

**Q: What can be causes of medial deviations of ureter In pelvis ?**

**A:** Bladder diverticulum  
Common iliac artery aneurysm  
Post Sx fibrosis  
RPF

**Q. How CT Scan findings differ between RPF and malignant masses in retroperitoneum?**

**Ans.** RPF is less localized (more vertical expansion)  
Malignancy displaces the aorta forward and ureters laterally  
RPF doesn't displace aorta and pulls ureters medially  
Malignancy enhance heterogeneously  
RPF is Poorly enhancing but has a homogenous enhancement.

**Q. When will RPF enhance on CECT?**

**Ans.** Inflammatory stage

**Q: Upto what levels of creatinine you can do contrast studies?**

**A:** Upto 1.2 mg/dl -No problem  
1.2 to 1.4 mg/dl-with adequate hydration  
1.4 to1.8 mg/dl--with acetylcysteine bromide cover (Table BronAC) 600 mg  
Upto 2.7mg/dl- MRI Gadolinium

**Q: How will you prepare a patient of raised creatinine for CECT?**

**A:** Fluid (N.S.) at 1 ml/kg/hr for 12 hrs pre & post contrast

-12 Hrs ,	-6 Hrs	→	O	→ +6 Hrs	+ 12 Hrs
600 mg	600 mg		CT SCAN	600 mg	600 mg
			Contrast		

**Q. When will you do MRI for RPF?**

**Ans.** When obstructive uropathy  
To get more soft tissue details  
To fl/up the Patient without radiation

**Q: What are the features of RPF in MRI?**

**A:** RPF has low signal intensity on T1, & T2

## **Neeraj Sharma's ...Notes For Urology Practicals**

High Signal intensity on T2 weighted image means inflammation / malignancy.

**Q. Is there a role of SPECT?**

**Ans.** Not proven

May be valuable in fl/up cases.

More specific in detecting inflammatory component

**Q: What are typical C.T. findings in RPF?**

**A:** Irregular, homogenous mass, isodense to psoas muscle on plain CT

From renal artery to bifurcation of aorta

Circumferencing aorta and lateral to aorta

Involves IVC and engulfs ureter

Does not cause aortic displacement

Does not push ureter laterally

Enhancement variable

**Q: What are CT findings S/o. malignancy?**

**A:** Strong Enhancement on contrast

Heterogenous texture

Push the water laterally

Displaces the aorta anteriorly

Mesenteric lymphadenopathy

RP lymph nodes

**Q: What is the importance of multiple retroperitoneal L.N.?**

**A:** Nothing important

Present in 25% of idiopathic RPF

Does not relate to malignant status of RPF

**Q: What is the status of FDG – PET?**

**A:** NO use for diagnosis

FDG – PET allows whole body examination and thus allows assessment of full extent and distribution of inflammatory process

Can help in choosing better Biopsy site

Assessment of post steroid and residual RPF mass

**What is the status of MRI?**

**Q:** Of all the imaging modalities; MRI can best tell benign V/s malignant RPF

**A:** On T1 images - RPF has low signal intensity where as malignancy has high signal intensity

On T2 images - RPF is low signal, malignant has high signal intensity

- Acute stage RPF may also have high intensity

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **How will you differentiate b/w RPF & Retroperitoneal hematoma?**

- Q:** Hematoma - High attenuation on non enhanced CT  
**A:** - High signal intensity on non enhanced T1  
RPF - Hypo attenuation on CT Scan

### **What are types of RPF**

- Q:** Primary - Idiopathic  
**A:** Secondary - Due to some cause  
Malignant - Having malignant changes

### **Q. What is primary RPF?**

- Ans.** RPF – idiopathic  
may be auto immune response to ceroid

### **Q. What is Ceroid?**

- Ans.** Ceroid is a Lipoprotein from athermatous plaque of vessels.

### **Q. What is secondary RPF?**

- Ans.** RPF due to a definitive etiology (pneumonic- RACTIFIED)  
Radiation  
Aortitis, Aortic Aneurysm  
Chemicals, asbestos  
Tumours of retroperitoneum  
Inflammation , amyloidosis, hemorrhage  
Fever – unknown, prolonged  
Infection – TB, histoplasmosis  
Endometriosis  
Drugs : methysergide, B – Blockers, Ergotamine, Bromocriptine

### **Q: What medicines and drugs are responsible for RPF?**

- A:** Drugs :
- Methysergide
  - Beta-adrenergic blockers
  - Lysergic acid diethylamide (LSD)
  - Methyldopa
  - Amphetamines
  - Phenacetin
  - Hydralazine
  - Cocaine

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What are Ergotamines used for?**

**A:** Migraine  
to patient of labour pains

**Q: What are the malignancies a/w RPF?**

**A:** Lymphoma  
Retroperitoneal sarcoma  
Carcinoid tumours  
Metastatic disease from primary cancers

**Q: What are the infections a/w RPF?**

**A:** TB, Histoplasmosis, actinomycosis

**Q: What are chances of underlying malignancy in RPF mass?**

**Ans.** 10%

**Q. What is the other name of RPF?**

**Ans.** Ormond's Disease

**Q. How is the Gross appearance of RPF?**

**Ans.** White tanned dense fibrous solid tissue.

**Q. What are the unusual sites of RPF – (Usual extent is renal hilum to pelvic brim)**

**Ans.** Mediastinum, optic orbit ,GIT,

**Q: Can RPF entrap duodenum?**

**A:** Yes, rarely

**Q;. What is the fibrous tissue component of RPF?**

**Ans.** Myofibroblasts and Collagen Type I

**Q. What are the other autoimmune diseases associated with RPF?**

**A.:** Autoimmune pancreatitis, Thyroiditis, Ankylosing spondylitis, cholangitis, uveitis.

**Q: What do you mean by medialization of ureter?**

**A:** When ureter becomes more than 1 cm medial to transverses process of lumbar spine

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. How specific is medialisization of ureter?**

**A.:** Non specific (Present in 18 – 20% of normal subject)

**Q What will be seen on contrast MRI?**

**A:** Variable degree of enhancement, this can be used to measure and response

**Q. What will you do next?**

**Ans.** If patient is stable then Biopsy from the mass  
If Obstructive uropathy – stenting / PCN ( fl/by biopsy)

**Q: What is classical RPF?**

**A:** Idiopathic  
@ Lumbar region of aorta  
Encasing great vessel

**Q: Is Biopsy mandatory before medical treatment ?**

**A:** - No need of Biopsy If...  
CT / MRI are suggestive of classical RPF  
No Lymphadenopathy  
no previous history of malignancy

**Q: Can enhancement on CECT be used as marker for metabolic activity?**

**A:** Not reliable

**Q: What imaging can suggest malignant RPF?**

**A:** Non-homogenous signal on T2 weighted MRI suggests malignant RPF

**Q. What form of Biopsy will you do?**

**Ans.** either USG / CT / MRI guided Core tissue biopsy ( better than FNAC)  
Otherwise open / laparoscopic Biopsy along with ureterolysis if needed

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What are the indications for doing Biopsy?**

**A:** Atypical location  
Atypical Lab Ix  
Progression of mass / not responding to steroids

**Q: What are the indications for Biopsy?**

**A:** A typical location of mass eg. Pelvic, peripancreatic  
Features S/o. Underlying malignant disease

**Q: What are the ways of doing Biopsy?**

**A:** CT guided  
Lap guided  
Open

**Q: How many biopsy cuts are minimally required?**

**A:** Atleast two tru-cut gun biopsies

**Q: What stents will you use?**

**A:** Long Term cook stents are better, but are compressible so white polyurethane stents are used or STAR shaped stents

**Q: What are the cause of rise in creatinine even after bilateral DJ stents are deployed?**

**A:** Because ureteric wall may be involved in fibrosis and thus making ureters aperistaltic  
Severe external compression causing blockade which is not relieved by stents

**Q: How urine drains through a stent?**

**A:** Only one third of the urine drainage through (inside) the stent and rest two third is outside the stent

**Q: How will you manage the patient of RPF?**

**Ans.** Will Start Medical therapy

## **Neeraj Sharma's ...Notes For Urology Practicals**

Prednisolone 60 mg @ alternate x 2 months

Tapered to 5 mg OD over x 2 months - Kardan Regimen

Continue 5 mg / day over 2 years

**Q. What are the other starting Regimen?**

**Ans.** Prednisolone + Azathioprine ( = Azoran, Imuran, - 50 mg x 10 Tab)

Prednisolone + colchicines

**Q. What do you expect of a steroid therapy?**

**Ans.** Resolution of pain and constitutional symptoms

Rapid fall in ESR

Diuresis

**Q. What is duration of steroid Therapy?**

**Ans.** 2 years

**Q: How will you fl/ up the patient?**

**A:** Bimonthly ESR, WBC, CRP for first 3 months

monthly ESR, WBC, CRP for next 6 months

CECT at 6th , 12th , 24th month

**Q. Which patients are best benefitted by steroid therapy?**

**Ans.** Steroids cannot reverse established fibrosis, they can only reduce ongoing inflammation. So patients with active disease are best responders.

**Q: How will you establish activeness of the disease?**

**A:** Active disease is depicted by increase ESR, raised CRP raised CBC, Active infection/inflammation on Biopsy

**Q: How do you known acute stage of RPF?**

**A:** Enhances on CECT

↑ CRP, ↑ TLC, ↑ ESR

T2 weighted images on MRI

Activity on PET Scan

**Q: What is the response rate of the conservative therapy?**



## **Neeraj Sharma's ...Notes For Urology Practicals**

**A:** 80%

**Q:** **What will you do if mass is still persists after 2 years of medical therapy?**

**A:** Do ESR, if ESR is raised- continue steroid therapy  
if ESR is normal- ureterolysis can be done.  
FDG – PET scan to see the FDG uptake and metabolic activity.

**Q:** **What if hydronephrosis persists and mass disappears after medical therapy?**

**A:** This means that ureter has gone into peristalsis failure  
Do MAG-3 diuretic scan, if Obstructed system – continue stenting  
if non-obstructed system– leave it.

...

**Q:** **What is the success rate of above Karder regimen?**

**A:** 82%

**Q:** **What other drugs can be used?**

**A:** Tamoxifen (Estrogen Receptor Antagonist) (10 -40 mg for 6 months)  
Immunosuppressants – Cyclophosphamide  
Azathioprine  
Cyclosporine

**Q:** **What is the status of Tamoxifen and other Immunosuppressants?**

**A:** 2nd line therapy in steroid refractory patients

**Q:** **What is the dose and ADR of Azathioprine ?**

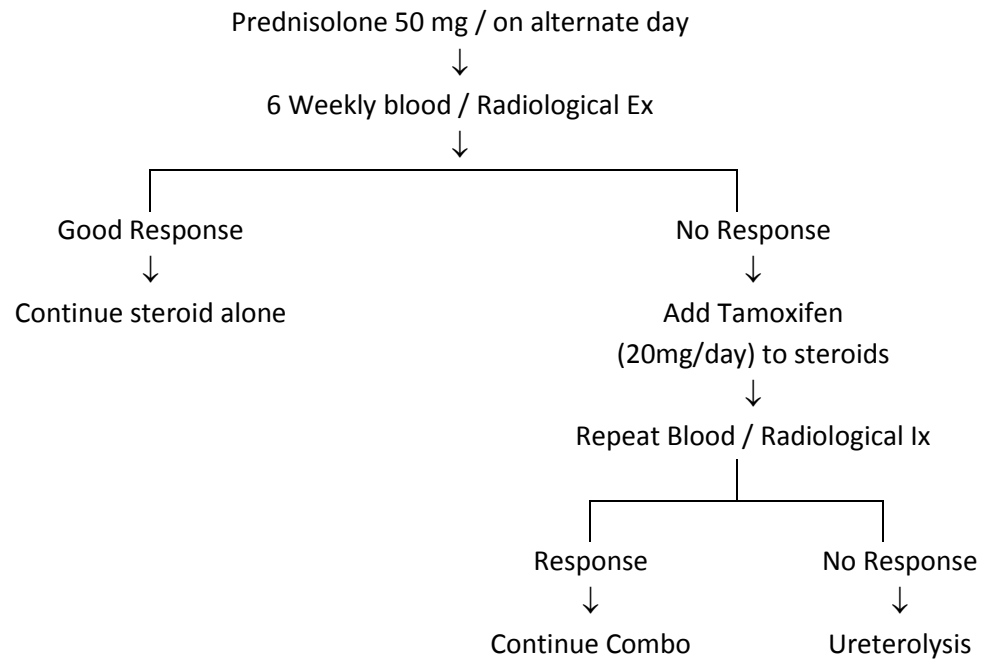
**A:** AZORAN / IMURAN = 50 mg x 10 tablets = Rs.107/-  
Dose = 1mg /kg / day  
ADR = Bone marrow depression, Diarrhoea, Hepato toxicity

**Q.** **How difficult is to put stent in these RPF case?**

**Ans.** relatively Easy

**Q. What are the indn for starting Tamoxifen?**

**Ans.** If there is poor response after starting steroids,



**Q. What are the side effects of Tamoxifen?**

**Ans.** Hot flushes,  
Halos around light  
Blurred vision  
Bone and Joint pain  
Epistaxis

**Q. What are the side effects of steroid therapy?**

**Ans.** Facial plethora, moon like face, Buffalo hump,  
Abdominal stria, decreased immunity  
Diabetes

**Q: What all medications will you start with steroids?**

**A:** Pantoprazole to prevent steroid induced gastritis.  
Shelcal to prevent steroid induced bone changes

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q**            **What other tests are required putting patients on steroids?**

**A:**            RBS, Sr. Creatinine coagulation profile

**Q.**            **When will you remove stents after ureterolysis?**

**Ans.**        8 Weeks - 12 Wks

**Q:**            **What are the M/c dilemmas in Post RPF medical management?**

**A:**            Residual mass after completion of steroidal therapy  
Residual HUN after completion of steroidal therapy

**Q:**            **How will you manager post steroid residual mass?**

**A:**            Assess :            1) Clinical symptoms  
                         2) ESR  
                         3) CRP  
                         4) Hounsfield units on CT scan contrast  
                         5) FDG – PET for activity

**Q:**            **Which is the most sensitive test for post steroid residual mass ?**

**A:**            Do FDG – PET  
Increase FDG accumulation S/o active mass  
Decrease in FDG uptake S/o fibrosis

**Q:**            **How will you manager post steroidal HUN?**

**A:**            Do DTPA / MAG -3 out obstruction followed by sequential USG for HUM do repeated B/d urea, creatinine

**Q:**            **How will you Do ureterolysis?**

**A:**            Open / Lap  
Incision- Midline, Transperitoneal approach.

**Q:**            **Why Midline incision?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

**A:** Because both the ureters need to be treated even if the disease is one sided.

**Q:** **How will you proceed for ureterolysis?**

**A:**

- Deploy bilateral RGC : Midline incision, Transperitoneal, mobilize colon medially
- Deep Biopsies of mass should be taken.
- Frozen section sent to rule out malignancy

**Q:** **How will you find the ureter in the retroperitoneal mass?**

**A:** Start dissection from free lower / distal end of ureter – use right angle forceps and dissect

**Q:** **How will you secure the freed ureter so that it does not get trapped again?**

**A:**

- a - Omental wrapping
- b - peritonealization of ureters
- c - Both the above
- d - Can do extreme lateralization and fixation of ureters

No difference in outcomes between 'b' & 'd'.

**Q:** **What is the blood supply of omental wrap flap?**

**A:** Gastro epiploic arteries – Left, Right respectively

**Q:** **How will you raise Omental Flap?**

**A:**

- Detach Omentum from Transverse colon
- Divide the omentum in midline
- Ligate and divide the short gastric vessels
- rotate the omentum laterally and cover the ureter

**Q:** **What is function of omental wrap?**

**A:** Provide protection against future entrapment in fibrosis  
Provides vascularity to mobilized ureters

**Q:** **Will you still give post op steroids?**

**A:** Yes,

- to deal with recurrence of fibrosis
- to deal with venous / IVC compression.

**Q:** **What will you do if ureterolysis is not feasible?**

**A:** Renal auto transplantation

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What are the complications of ureterolysis?**

**Ans.** Ureteric devascularized  
Ureteric Tear'  
Ureteric Strictures  
Injury – Vascular, Gut  
Recurrence of Ureteric entrapment

**Q: What will you remove stents after ureterolysis**

**A:** @ 2- 3months

**Q: What is the latest in RPF Mx?**

**A:** MMF & Steroid therapy mycophenolate mofetil (Swartz study)  
Rituximab (Human monoclonal antibody directed against CD-20 antigen)

**Q: As for ureterolysis, which approach is better, Lap or open?**

**A:** Lap is better in all respects  
Better out come  
Shorter hospital stay  
Less complication rate

**Q: Which approach will you take for open ureterolysis with omental wrap ?**

**A:** Midline vertical incision  
Transperitoneal approach  
Deploy RGC catheter fore-handedly  
Hunt for the ureter at crossing of iliac bifurcation  
Trace the ureter up to the PUJn  
Free the ureter  
Make a Omental flap; pass it underneath the ureter and loop it around ureter bringing it back to anterior / medial to ureter  
Fix the omental flap with stitches (hem-o-lock clips for lap)

**How will your fl/ up these patients?**

**Q:**

**A:**

- Symptoms assessment
- ESR & CRP
- USG for fl/ up of ureteric Obstruction
- CT / MRI for size of RPF

**Neeraj Sharma's ...Notes For Urology Practicals**

**What is cut of value of K<sup>+</sup> and creatinine of giving General anaesthesia?**

**Q:** K+ level > 5.5

**A:** Creatinine level > 5.5

## Do Hemodialysis Prior to G/A

↑K<sup>+</sup> level → ↑ cardiac arrest

↑ creatinine level → ↓ washout of anaesthesia agents; more DVC, Coagulopathy

**Q. What is Post Obstructive Diuresis?**

**Ans.** POD is the process of significant polyuria ensuing after relief of Bilateral urinary tract obstruction (urine output >200 ml/hour).

**Q. What are the mechanisms of P.O.D?**

**Ans.** Physiological - ↑ water accumulation

- ↑ solute accumulation

↓

Obstruction relieved

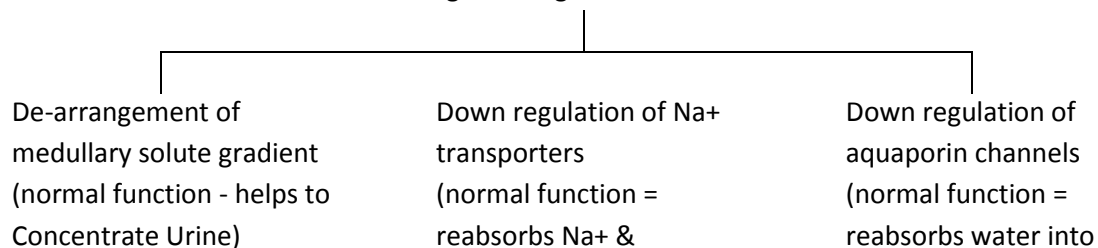
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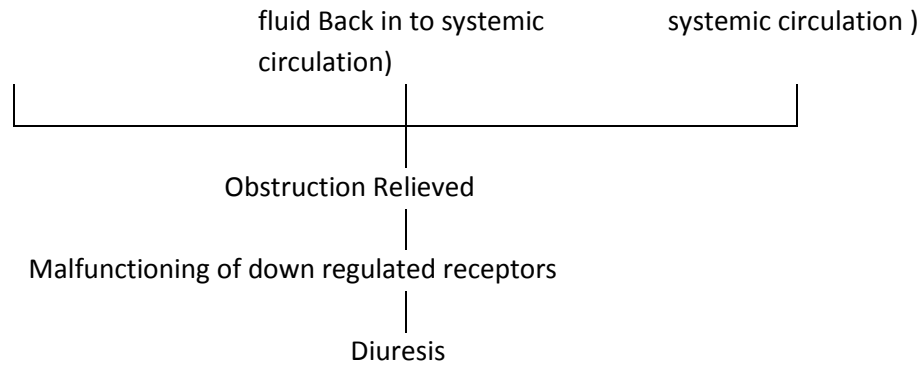
## Diuresis

- Pathological - Due to tubular dysfunction

**Q. What are the factors responsible for pathological POD?**

**Ans.** Long standing obstruction





**Q. What are the stages of POD?**

**Ans.** Hyper volumeic state



Physiological Diuresis



Euvolumeic state



Pathological Diuresis



Dehydrated state

**Q. What are the types of pathological Diuresis?**

**Ans.** Pure water Diuresis = Urine USM < 150

Ur. Osm < 0.9

Plasma Osm

Solute Diuresis = Urine USM > 250

Ur. Osm > 0.9

Plasma Osm

Mixed Diuresis = Urine USM  $\cong$  200

Ur. Osm = 0.9

Plasma Osm

**Q. How will you manage Post Op. Diuresis?**

**Ans.** Day 0 : Measure hourly urine output and replace 80% of it.  
Replace 80% of Last Hour u/o using 0.45 % NS

**Neeraj Sharma's ...Notes For Urology Practicals**

Continue this for 24 Hr

Measure Sr. Electrolytes and urine OSM every 4 hrly

Day 1 : If no signs of fluid deficit next day

next day fluid replacement is 1 litre less than Day – 0 Total urine output

Do 8 hrly sr. electrolytes

If signs of fluid deficit present on day -1, repeat protocol of day 'O'

Day 2 : If urine output drops to < 3 litres / day

All orally allowed

Measure 8 hrly Sr. Electrolytes

Replace electrolytes K<sup>+</sup>, Mg<sup>++</sup> as needed.





# ***Neeraj Sharma's-***

## ***NOTES FOR UROLOGY PRACTICALS***

### ***RCC***

***Chapter editor ....Dr.N.Raghawan.***

#### **RCC**

##### **Rcc incidence etio pathology**

**Q. What is RCC?**

**Ans.** RCC is the renal cell carcinoma.  
Carcinoma arising from different parts of nephron

**Q. What is the incidence?**

**Ans.** 8% of all adult malignancies are RCC

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What is the age of presentation of RCC?**

**Ans.** 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> decade of Life

**Q. What is male to female ratio?**

**Ans.** 3:2, more in males

**Q. What is the lymphatic drainage of Kidney?**

**Ans.** Tri – Laminar lymphatic flow

1<sup>st</sup> Lamina - Renal Parenchyma

2<sup>nd</sup> Lamina - Sub-capsular

3<sup>rd</sup> Lamina - Perinephric fat

**Q. What is the trilaminar lymphatic flow of kidney?**

**Ans.** 1<sup>st</sup> Lamina - lies within renal parenchyma

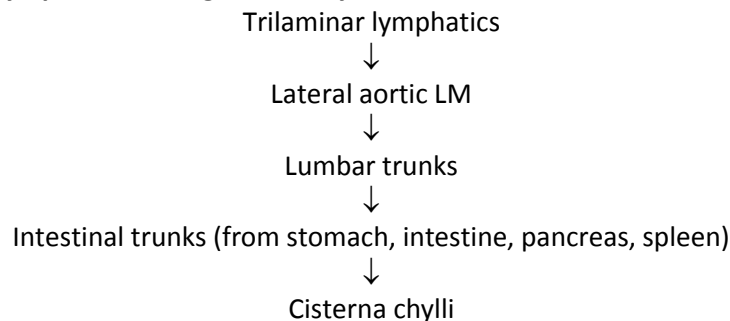
2<sup>nd</sup> Lamina - lies @ subcapsular level

3<sup>rd</sup> Lamina - lies in perinephric fat

- These intra level (lamina 1 ) lymphatics emerge as 4 – 7 hrs which emerge @ renal hilum to join the 2<sup>nd</sup> and 3<sup>rd</sup> level lymphatics
- These then eventually converge along the renal vessels to the lateral aortic nodes

**Q. What is the lymphatic drainage of kidney**

**Ans.**



Cisterna chyli is a dilated sac @ lower end of thoracic duct. It receives fatty chyle from intestinal trunks – short circuiting or obstruction leads to chyluria

**ETIOLOGY**

**Q. What is the etiology of RCC?**

**Ans.** i) Familial (3%)  
ii) Sporadic / environmental (97%)

**Q. What are risk factors for sporadic RCC?**

**Ans.**

- Tobacco (Relative Risk – 2 times) (Max)
- Obesity
- Asbestos
- Dietary Fat
- Lead Compounds
- Aromatic Hydrocarbons
- Radiations

**Q. What is the site of origin of clear cell carcinoma ?**

**Ans.** Proximal convoluted tubules

**Q. Which other sub type of RCC originated from PCT?**

**Ans.** Papillary Carcinoma  
P - Papillary  
C - Clear Cell  
T - Tumours

**Q. What are the subtypes originating from DCT and collecting ducts?**

**Ans.** Collecting duct carcinoma  
chromophobe carcinoma  
Medullary carcinoma

**Q. What is Bellini's carcinoma?**

**Ans.** Collecting duct carcinoma is also known as Bellini's carcinoma.

**Q. What is the rate of localized tumor growth?**

**Ans.** 0.28 cm / year

**FAMILIAL RCC**

**Q. What % of RCC are familial?**

**Ans.** 3%

**Q. What are the familial Renal cell Carcinoma Syndromes?**

**Ans.** VHL - Von Hippel Lindau

HP RCC - Hereditary Papillary – RCC HPRCC

FL RCC - Familial Leiomyomatosis – RCC

BHD - Birt Hogg Dube

TS - Tuberous sclerosis

**Q. What are the components of VHL syndrome?**

**Ans.** VRPRH– EC

- VHL
- RCC & renal Cyst
- Pheochromocytoma
- Retinoblastoma
- Hemangioblastoma of CNS- Spine, Cerebellum, Brain Stem
- Endolymphatic cysts of the ear
- Cysts of Pancreas & Epididymis

**Q. What are chances of getting RCC in VHL patients?**

**Ans.** 50%

**Q. What Histological type of RCC is a/w VHL?**

**Ans.** Clear Cell Carcinoma

**Q. What is the type of mutation in VHL gene known as?**

**Ans.** Knudson's hypothesis pattern

**Q. What is the peculiarity of VHL-RCC?**

**Ans.**

- Bilateral,
- Multifocal,
- young age,
- Recurrent

## **Neeraj Sharma's ...Notes For Urology Practicals**

Type	VHL	HRCC	FLRCC	Birth Hogg – Dube
Chromosome No	3	7	1	17
Gene	VHL Gene	C-met Proto-onco gene	Fumarate Hydratase gene	BHD Gene
Inheritance	Autosomal Dominant (AD)	AD	AD	AD
RCC Histology	Clear Cell RCC	Papillary RCC (Type – 1) multiple renal adenomas <1cm	Papillary RCC Type – 2	Chromophobe RCC Oncocytomas
Clinical Presentation	VRPRH Cyst – Pancreas and epididymis	pediatric age group	Leiomyoma uterine Leiomyoma-cutaneous	pneumothorax Lung cysts
Mx	Nephron sparing surgery( <b>NSSx</b> )	NSSx	Resect @ any size aggressive	NSSx
Others	Bilateral Multifocal young age	Multi centric foci	Radical Nx / partial Nx	BHD Gene Mutation leads to follicular degenerations

**Q. What are the chances of recurrence after NSSx?**

**Ans.** 40% @ 4 yrs  
50% @ 5 yrs

**Q. What is the cut off size for surgical intervention?**

**Ans.** Minimum 3 cm (if histology is known)

**Q. What are the Sub types of VHL Diseases?**

**Ans.** Type 1 : No Pheo; RCC (+); Hemangioma (+)  
Type 2 : With Pheo

- Type 2A : RCC Absent / hemangioma present
- Type 2B: Both Present
- Type 2C: Only Pheo present, no RCC ,no hemangioma

**Q. What is Lynch syndrome?**

**Ans.** Hereditary non polyposis colo-rectal cancer + RCC can be part of lynch syndrome

**Q: How will you do screening for VHL patients?**

**A: Screening VHL**

## Screening protocol for VHL disease

Body System	Regimen	Follow-up
Renal	Annual abdominal US from 10 y	CT or MR Depending on US findings
CNS	MRI of brain & spine at 20 y Annual neurologic exam if symptoms	Repeat imaging if suspicion
Adrenal	Annual 24-h urinary VMA from 10 y Annual blood pressure measurement	Imaging if VMA abnormal
Ophthalmic	Annual ophthalmoscopy from 5 y With or without fluorescein	—
Auditory	Questionnaire Audiogram if questionnaire positive	MRI If audiogram abnormal

Leung RS et al.. RadioGraphics 2008 ; 28 : 65 – 79.

Readers are requested to see <http://www.vhl.org/wordpress/library/screening-guidelines.pdf>  
VHL Alliance guidelines for screening VHL .

**RCC HISTOLOGY**

**Q. What are the histological subtypes of RCC?**

**Ans.**

Clear Cell Carcinoma	80%	- From PCT
Papillary RCC	10 – 15%	<ul style="list-style-type: none"> <li>• From PCT</li> <li>• Childhood RCC</li> </ul>
Chromophobe RCC	4%	- From DCTs
Collecting Duct RCC	1%	-From Collecting duct
Medullary Ca	Rare	Related to sickle cell disease
Multi cystic Ca		childhood RCC
Mucinous Ca		
Undifferentiated		

**Q. What is the gross morphological appearance of clear cell RCC?**

**Ans.**

- Golden Yellow color
- Usually exophytic and
- fibrous pseudo capsule

**Q. With which familial syndrome clear cell RCC is associated with?**

**Ans.**

VHL

**Q. What is the M/c histological type a/w sporadic RCC?**

**Ans.**

Clear Cell RCC

**Q. What is the name of histological classification system?**

**Ans.**

WHO 2004; originally by KOVAC's

**Q. What are the Sub types of papillary RCC?**

**Ans.**

Papillary Type -1	Basophilic Cells a/w with HPRCC
Papillary Type -2	Eosinophilic Cells a/w with HLRCC

**Q. With which condition chromophobe RCC is a/w?**

**Ans.**

Birth Hogg Dube syndrome

**Q. What is the gross morphological appearance of collecting duct ca?**

**Ans.**

Grayish White

**Q. What is the disease a/w medullary RCC?**

**Ans.**

Sickle cell Disease

Sickle cell entrapment in

Medullary collecting ducts



Hemolysis



## Neeraj Sharma's ...Notes For Urology Practicals



RCC Cancer Medullary ← Chemical inflammation

**Q. Which histological subtypes is a/w childhood RCC?**

**Ans.** Papillary RCC  
Medullary RCC

**Q. What is the peculiarity of childhood RCC Mx?**

**Ans.** Aggressive Mx including lymphadenectomy

**Q. What is the histological grading system for RCC?**

**Ans.** Furman's grading system

**Q. What are the components of Furman's grading system?**

**Ans.** Nuclear size (size of nuclear)  
Nuclear Outline (shape of nuclear)  
Nucleoli appearance

**Q. What are the total grades in Furman's system?**

**Ans.** 1, 2, 3, & 4

Grade	Nucleus size	Nuclear Outline	Nucleonic appearance
1	Upto to 10 µm	Round	Absent
2	15 µm	Wavy	Small
3	20 µm	Irregular	Prominent
4	25 µm	Bizarre	Prominent, Heavily chromatic

**Q. What percentage of Sporadic RCC are Bilateral?**

**Ans.** 3% of sporadic RCCs are Bilateral

**Q. What Percentage of RCC have venous involvement?**

**Ans.** 5-10%

**Q. Which histological subtypes is a/w multi centricity?**

**Ans.** Papillary < HPRCC

**Q. What is the Basic Histological type of RCC?**

**Ans.** Adenocarcinomas – From Renal tubular epithelial cells

**Q. What is sarcomatoid differentiation?**

**Ans.** Sarcomatoid differentiation is characterized by

- Spindle cell histology
- Infiltrative growth pattern
- Very aggressive nature
- Positive staining for vimentin

## Neeraj Sharma's ...Notes For Urology Practicals

**Q. What are the prognostic implications as per histological types of tumours?**

**Ans.**

- Chromophobe & Papillary tumours have relatively good prognosis
- clear cell has intermediate prognosis
- Medullary and collecting duct have poor prognosis as they are centrally located and metastasize early.

### CLINICAL PRESENTATION

**Q. What is the M/c presenting feature of RCC?**

**Ans.** Incidental (>50-60%)

**Q. What is the classical triad for RCC?**

**Ans.** Flank Pain, Hematuria, Abdominal mass

**Q. What is the other name of this Triad?**

**Ans.** Too Late triad

**Q. What can all be the clinical presentation of a RCC Patient?**

**Ans.** Incidental >50%

#### Local growth factors

- Hematuria
- Flank Pain
- Abdominal Mass
- Peri-renal Hemorrhage

#### IVC involvement

- Lower Limb edema
- Varicocele
- distended Abdominal veins

#### Mets

- Cough
- Bone Pain
- Cervical LN
- Weight Loss
- Fever
- Malaise

#### PMS

- Hypercalcemia
- Hypertension
- Polycythemia
- Stauffer's syndrome

**Q. What are the indicators of Advanced stage disease in RCC?**

**Ans.**

Weight Loss	}	Symptoms	- Bone Pain Cough
Fever			
Night sweats		}	Signs
Palpable mass			
Cervical LN			
Varicocele ( <i>Non reducible</i> )			
Pedal edema			

**Q. When will you get right sided varicocele?**

**Ans.**

- (1) Abnormal draining rt gonadal vein into right Renal Vein
- (2) Bland thrombus at the ostium of Gonadal vein
- (3) Rarely tumour thrombus at Ostium of Gonadal vein
- (4) I.V.C. Thrombus.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. Why is there hematuria in RCC?**

**Ans.** Infiltration of the P.C. System by RCC

Increased neovascularity

Renal Congestion

Obstruction of venous out flow

A.V. Malformation

} may precipitate / aggravate the hematuria.

**Q. What are the causes of pain in contralateral side kidney?**

**Ans.** Due to compensatory hypertrophy

Due to Sympathetic nephritis.

**Q. How will you differentiate Glomerular hematuria from renal hematuria?**

**Ans.** See for RBC shape & casts. Proteinurea

**Q. What is urokinase?**

**Ans.** Urokinase is a thrombolytic agent, present normally in urine (?? Produced from kidney / urothelium)

**Q. What is imp. of vermiform clots?**

**Ans.** Bleeding is from upper tracts

**Q. What is persistent prostatic hematuria?**

**Ans.** When there are recurrent / unrelenting episode of hematuria due to prostatic cause .

**PARANEOPLASTIC SYNDROMES**

**Q. What percentage of patients will have PNS (Para Neoplastic syndromes)**

**Ans.** 20%

**Q. What are the major PNS a/w RCC?**

**Ans.**

- Anaemia
- Blood Pressure
- Cachexia
- Dearranged LFTs
- ESR
- Fever
- Glucose Intolerance
- Hypercalcemia
- Icterus and Jaundice (Stauffer's syndrome)

**Q. What is the M/c PNS?**

**Ans.** ↑ ESR > Anaemia > Cachexia > Hypercalcemia

**Q. What are the causes of hypercalcemia?**

**Ans.** causes of hypercalcemia

- PTH Like peptide secretion
- Tumor derived Vit – D
- Prostaglandin secretions
- Osteolytic bone mets/micromets.

**Q. What is the normal level of Sr. Ca<sup>++</sup>?**

**Ans.** 9 – 10.5 mg / dl

**Q. What types of metastatic lesions are there in bone?**

**Ans.** Osteolytic

**Q. What are symptoms of ↑ PTH?**

**Ans.** Bone, stone, groan, moans

- Bone Pain
- Stone
- Abdominal Groans
- psychic moans

**Q. What are the substances produced by Kidney?**

**Ans.**

- Renin,
- Erythropoietin,
- Prostaglandins,
- 1, 25, OH – Vit – D

**Q. What is the cause of fever and weight loss?**

**Ans.** Increase level of-- insulin, cytokines and inflammatory mediators, lead to fever and weight loss.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What are the symptoms signs of hypercalcemia?**

**Ans.** Anorexia, Fatigue, Nausea – symptoms

Sign : Decreased / slow deep tendon reflexes

ECG changes – arrhythmias, short QT interval and Osborn wave.

**Q. What is the medical Mx of Hypercalcemia?**

- Ans.**
1. Hydration fl/by
  2. Diuresis using Lasix
  3. Bis-phosphonates
  4. Corticosteroids
  5. Calcitonin

**Q. What is the M/c used Bis-phosphonates?**

**Ans.** Zolendronic Acid – 4 m g IV in 100 ml Saline monthly once. Or @21 days.

**Q. What lx is must before giving Zolendronic acid?**

- Ans.**
- RFTs Urea , Creatinine as Zolendronic acid (ZA) causes renal impairment .
  - in altered renal functions denusumab (Xgeva)120 mg/SC/month can be given.
  - Dental Examination as ZA causes osteonecrosis of jaw .
  - Please repeat Sr.Ca<sup>++</sup> levels before each ZA injection infusion.

**Q. What are the causes of anemia in RCC?**

- Ans.**
- Hematuria,
  - PNS Micro-Coagulopathy
  - Bone Marrow Depression
  - Cachexia, Nausea, Anorexia

**Q. What are the causes for HTN?**

- Ans.**
- ↑ Production of Renin by tumour itself
  - ↑ Compression of renal artery / vasculature / parenchyma thus leading of ↑ Renin
  - AV. Malformations
  - Polycythemia
  - Ureteric Obstruction (rare)

**Q. What is the cause of raised ESR in RCC ?**

**Ans.** Polycythemia

Increased cohesiveness between RBC's.

**Q. What is the cause of polycythemia?**

**Ans.** Increase Production of Erythropoietin by tumour

Erythropoietin released in response to Hypoxia / HIF factor.

**Q. What is Stauffer's syndrome?**

**Ans.** Non Metastatic hepatic dysfunction is Known as Stauffer's syndrome.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What are the components of Stauffer's syndrome?**

**Ans. BAAPTN** Stauffer's syndrome

- Bilirubin - Low
- Albumin – Low (2<sup>nd</sup> M/c)
- Alkaline PO<sub>4</sub> – High (M/c)
- Prothrombin time – High
- Thrombocytes – Low – Thrombocytopenia
- Neutropenia – Low neutrophils

**Q. What are the Ix that can be done in cases of derange LFTSs?**

**Ans.**

- Liver appearance on USG / CT scan
- Rule out hepatic mets
- Liver Biopsy (If done will suggest Non- specific hepatitis)

**Q. What is the cause behind Stauffer's syndrome?**

**Ans.** Increased production of Cytokinin interleukin IL- 6.

**Q. In What % of patients; LFTs will come back to normal limits after Radical Nx?**

**Ans.** 70% (60 – 70%)

**Q. What does persistence of Stauffer syndrome means ?**

**Ans.** Persistence means presence of Unresected tumor or missed tumor

**Q. What are the causes of leading PNS of RCC?**

<b>Ans.</b>	<b>Anemia</b>	<b>HTN</b>	<b>Hypercalcemia</b>	<b>ESR</b>
	<ul style="list-style-type: none"><li>• Hematuria</li><li>• Microcoagulopathy</li><li>• Cachexia, Anorexia</li><li>• Osteolytic mets</li><li>• BMD</li></ul>	<ul style="list-style-type: none"><li>• Renin by RCC</li><li>• Arterial Compression</li><li>• Ureteric Obstruction</li><li>• Micro Aneurysm Hyper dynamic. Circulation</li><li>• Polycythemia</li></ul>	<ul style="list-style-type: none"><li>• PTH related peptide</li><li>• High Vit-D release by RCC</li><li>• Osteoclastic mets</li></ul>	<ul style="list-style-type: none"><li>• Polycythemia</li><li>• High cohesiveness</li></ul>

**LET'S REVISE**

- Types of RCC
- Risk factors for RCC
- Origin of RCC – PCT, DCT
- Bellini's Carcinoma
- 3% - Familial
- Types of Familial 3, 7, 1, 17
- VHL, Components, types, screening
- Histological subtypes of RCC
- WHO 2004 histological classified
- Medullary RCC – pediatrics
- Papillary RCC – Pediatrics
- Furman's grading system
- Papillary Type 1 – Basophilic
- Type 2 – Eosinophilic
- 2% RCC Bilateral
- 10% Venous involvement
- Clinical presentation of RCC
- Substances produced by kidney
- Causes of fever. HTM, Anaemic, Hypercalcemia, High ESR
- Sign / symptoms of hypercalcemia
- Components of Stauffer's Syndrome BAAPTM
- T1a, T1b1 – IBS Gill
- Robson's Staging of RCC
- Signs of IVC involvement

**STAGING OF RCC**

**Q. What was the Traditional Staging system?**

**Ans.** Robson's staging system

Stage I - Tumour within Capsule

Stage II - Tumour outside capsule but within Gerota's fascia

Stage III - LN positive or Renal Vein or IVC involvement

Stage IV - Adjacent organ involved / metastasis

**Q. What are the signs & symptoms of metastatic stages?**

**Ans.** Symptoms - Symptomatic presentation

Bone Pain

Cough

Weight Loss > 10%

Anorexia

Signs - Poor performance status

Palpable mass

Supra Clavicular LN

Para Neoplastic syndromes

**Q. What are the signs of venous involvement?**

- Ans.**
- Non-reducible varicocele
  - Lower extremity Oedema
  - Prominent abdominal wall veins (Caput medusae)
  - non function of Kidney

**Q. What are the signs of adrenal involvement**

- Ans.**
- Enlarged gland on CT
  - Downward displacement of Kidney
  - Abdominal Palpable mass
  - intra - Op findings of adrenal involvement
  -

**Q. What are the signs of nodal involvement on CECT?**

**Ans.** LN Size of more than 2 cm in Hilar / Retroperitoneal region.

**Q. What is the TMM staging of RCC?**

**Ans.** TMM – 2009

Tx To

T1 Tumor Less than 7 cm

T1a 0 – 4 cm

T1b 4 – 7 cm

T2 Tumor More than 7cm

T2a 8- 10 cm

T2b More than 10 cm

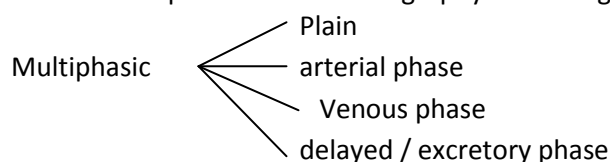


## Neeraj Sharma's ...Notes For Urology Practicals

T3	Tumour invades perinephric fat or Renal vein
T3a	Perirenal / perinephric fat involvement or Renal vein thrombus
T3b	IVC thrombus upto diaphragm
T3c	IVC thrombus above diaphragm or IVC wall invasion
T4	continuous ipsilateral adrenal involvement Adjacent organ involvement Beyond Gerota's fascia spread
Nx,	N <sub>0</sub> – No. LN
	N <sub>1</sub> – Regional LM involved
Mx	M <sub>0</sub> – No distant mets
	M <sub>1</sub> – distant Mets positive.

**Q.** Who described the sub staging of T<sub>1</sub> & T<sub>2</sub>, into T<sub>1a</sub>, T<sub>1b</sub> and T<sub>2a</sub> & T<sub>2b</sub>?  
**Ans.** Inderbir Singh Gill

**Q** What type of CT SCAN is done for evaluating renal mass?  
**A** a contrast enhanced abdominal C.T. scan Triphasic C.T. Scan  
CECT Abdomen multiphasic with C.T. urography & C.T. angio preferably



I will pre-order the Hounsfield Unit measurements in CECT request.

**Q** Upto what level of Creatinine can you do contrast studies?  
**A.** upto -1.8 mg/dl – CECT  
Upto -2.7 mg/dl – MRI with Gadolinium } with Preparation.

**Q** How will you prepare patient with raised creatinine for contrast CECT?  
**A.**

- Ensure hydration of patient by giving I.V. fluid N.S 0.9% @ 1ml/kg/hr from 12 hours before CECT and continue upto another 12 hours after CECT.
- N-acetyl cysteine (NAC) 600 mg orally twice a day, one day before CECT, on the day of CECT ( and additional one day after CECT optionally.)

**Q** What is the present status of giving NAC before CECT?  
**A**

- N-acetylcysteine (NAC) 600 mg orally twice a day, on the day before and of the procedure if creatinine clearance is estimated to be less than 60 mL/min [1.00 mL/s]) may reduce nephropathy.
- A randomized controlled trial in 2006 found that higher doses of NAC (1200 mg IV bolus and 1200 mg orally twice daily for 2 days) benefited (relative risk reduction of 74%) patients receiving coronary angioplasty with higher volumes of contrast.

## **Neeraj Sharma's ...Notes For Urology Practicals**

- A clinical trial from 2010, however, found that acetylcysteine is ineffective for the prevention of contrast-induced nephropathy. This trial, involving 2,308 patients, found that acetylcysteine was no better than placebo; whether acetyl cysteine or placebo was used, the incidence of nephropathy was the same — 13%.
- a CIN Consensus Working Panel reported in 2006 that "no adjunctive medical or mechanical treatment has been proved to be efficacious in reducing the risk of CIN", and specifically that "N-acetylcysteine is not consistently effective in reducing the risk for CIN"
- There are no clear cut guidelines for use of NAC; nephrologists' opinion may be taken.

**Q. What is the mechanism of renal injury by contrast and how can NAC be renoprotective?**

- A.**
- Injury to the renal medulla appears to be the primary problem in CIN, although the precise mechanisms involved are not well understood.
  - Current hypotheses include disturbances in renal haemodynamics, an osmotic effect, and a direct toxic effect of contrast media on tubular epithelial cells. The last of these may be a result of toxic free radical release occurring after contrast administration. Whether these mechanisms act separately or together to cause renal insufficiency is not clear.
  - Administration of contrast leads to a biphasic hemodynamic change in the kidney, with an initial transient increase followed by a prolonged decrease in renal blood flow (RBF)
  - Acetylcysteine possesses both vasodilatory and antioxidative properties and may be renoprotective via these mechanisms.

**Q. What enhances more on CECT, normal renal parenchyma OR renal tumours RCC?**

**Ans.** RCC enhances less than normal renal parenchyma.

**Q. If Vascularity of RCC is more than renal parenchyma, why then the RCC enhances less than normal parenchyma?**

**Ans.** Enhancing of Renal parenchyma after giving contrast is due to contrast filtration into nephron and tubules and relative stagnation and concentration of contrast in tubules. Thus enhancement of renal parenchyma comes from the contrast that is in the lumen of tubules. Whereas, RCC, although arises from PCT, does not have functioning tubules within tumour. Enhancement of RCC is due to relative increased vascularity of this region. Thus RCC (though enhances) but enhances less than the normal renal parenchyma. But there is early enhancement and early washout of contrast from RCC because the contrast is in blood vessels.

**Q. How will you differentiate RCC from TCC on CT scan?**

**A**

- RCC is Brightly enhancing on CECT
- RCC is more peripheral / exophytic In kidney location v/s TCC is central.
- RCC distorts the PC system but does not infiltrate it
- RCC never fills up the PC system V/S TCC fills the PC System.
- RCC – Central Calcification, TCC – Peripheral calcification.
- On clinical presentation RCC may present as abdominal lump v/s hematuria by TCC.

**Q. What are the modalities to investigate IVC thrombus?**

- Ans.**
- CT Scan
  - MRI with contrast (gold standard)
  - Trans-esophageal ultrasound

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Doppler USG
- Renocavography

**Q. What is the status of Trans-Esophageal- USG?**

**Ans.** Trans-Esophageal – Echo cardiography has no distinct Advantage over CT/MRI

- Presently used intra operatively for detection of tumour

Disadvantage

- Operator dependant
- Invasive
- Only cranial extent can be definitely told and not caudal

**Q. What are the Indications for venocavography?**

**Ans.**

Equivocal MRI / CT

Patient not fit for MRI

- Pace maker
- Claustrophobia
- Metal implants

**Q. How will you differentiate tumor thrombus from bland thrombus on imaging studies?**

**Ans.** Tumour thrombus

- will enhance on contrast
- tumour thrombus extends towards the heart, whereas bland thrombus can extend caudally also

**Q. What is the TMM staging for Adrenal involved ?**

**Ans.** T4- (For Upper Polar Tumour)

M1- (For Lower Polar Tumour)

**Q. What is the TNM Staging for IVC wall infiltration?**

**Ans.** T<sub>3C</sub>; it is independent of level of tumour thrombi

**METASTATIC WORKUP**

**Q. What does metastatic work up include**

**Ans.** CECT Abdomen findings  
CXR – PA  
LFTS (Sr. Abdominal Pain)

**Q. What are the indications for doing CT chest pre-operatively?**

**Ans.**

- Patients with Pulmonary symptoms
- Patients with Abnormal CXR – PA
- Patients with Locally advanced disease (beyond T<sub>2A</sub> )

**Q. What are the indications for doing Bone Scan?**

**Ans.** Patients with symptoms (unrelenting Bone pain / new onset Bone pain)  
Patients with raised serum Alkaline phosphatase

**Q. What is the full form of ECOG?**

**Ans.** Eastern Co-operative Oncology Group

**Q. What are the Indications for PET CT?**

**Ans.** CT/ MRI - suggestive of one / two sites metastatic disease – to find out total number of metastatic sites  
- equivocal / doubtful CT/ MRI findings  
SUV\* -Upto 2.5 SUV Units in Benign, more than 6 SUV Units in malignant  
(\*Standard Uptake Value)

**Q. What is the latest form of PET-CT?**

**Ans.** <sup>99</sup>Tc labeled CA – 9 ..PET – CT.

**Q. What is the most common secondary to Kidney?**

**Ans.** Oat cell carcinoma of Lung

**PROGNOSIS & SURVIVAL**

**Q. What are the prognostic factors in RCC?**

**Ans.**

Anatomic	Tumor Size
Tumour wise	Extension into Adjacent Organ
	Lymph node involvement
	Metastatic Involvement
Clinical	ECOG Performance score
	Symptomatic Patient
	PNS features

## **Neeraj Sharma's ...Notes For Urology Practicals**

Histological	Grade of tumour
	Subtype of tumour
	LVI
	Sarcomatoid differentiation
	Collecting system involvement
Molecular	CA – P
	VEGF
	E Cad
	P-53

**Q. What is the approximate 5 yrs survival in RCC?**

<b>Ans.</b>	T1 a	100%	@5yrs
	T1 b	90%	
	T2 a	80%	
	T2 b	70%	
	T3 a	60%	
	T3 b	50%	
	T3c	40%	
	T4	30%	
	N1	20%	
	M1	10%	

**Q. Which histological subtype has good prognosis?**

**Ans.** Stage to Stage & Grade to Grade  
Chromophobe  $\geq$  Papillary  $\geq$  Clear Cell  $\geq$  Collecting duct  $\geq$  Medullary worst.  
But due to better therapeutic control (By targeted agents) Clear Cell RCC has better outcome in terms of survival

**Q. Which is the most importance cell molecular marker of RCC**

**Ans.** CA – IX

**Q. What are the famous nomograms for RCC?**

**Ans.** Karakiewicz nomogram  
KATTAN nomogram  
SSIGN – Stage, Size, Grade (Furman), Necrosis  
Leibovich programme Score  
Pantuck  
Zisman

**Q. What is Kattan Nomogram?**

**Ans.**

- Tumor Size
- Tumor Stage
- Patient Symptomatic
- Histological Subtype

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What is Karakiewicz nomogram?**

**Ans.** Karakiewicz nomogram

- TNM Stage
- Size
- Subtype
- Grade
- Symptoms

**PLEASE READ** : The Karakiewicz nomogram is the most useful clinical predictor for survival outcomes in patients with localized renal cell carcinoma. Tan MH , **PMID: 21567386**

**Q: What is Leibovich programme Score?**

**Ans.**

- Stage
- Size
- Subtype
- Grade
- Necrosis

### **Treatment of T1 & T2 RCC**

**Q. What is the probable histology of a solid enhancing mass?**

**Ans.** 20% Benign (Usually Oncocytomas or very rarely an atypical AML)  
80% Malignant

**Q. How can you stratify the risk of Benign v/s. malignant based on tumour size?**

**Ans.** See for tumour size

0 -2 cm - 30% are Benign	}	Campbell et al.
2 -3 cm - 20% are Benign		
3 – 4 cm - 10% are Benign		
>4 cm - Less than 10% Benign		

**Q. What other feature (other than Benign v/s malignant nature) can be commented upon / guessed upon by looking at the tumour size?**

**Ans.**

- Aggressiveness of the tumour in the form of perinephric fat invasion; LVI and venous involvement
- T1a tumour are much less aggressive than (0-4cm) T1b – (4 – 7 cm)

**Q. What is the percentage of LN involvement stage wise?**

**Ans.**

T1	- 1%	}	<b>Michael Blute (v.imp)</b>
T2	- 5%		
T3	- 10%		
T4	- 30%		

**Q. What is the Gold Std Mx for RCC?**

**Ans.** Radical Nx (Nephron sparing if feasible)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What is the disadvantage of Radical Nx?**

**Ans.** Predisposes to CKD → which in turn leads to cardiovascular events and other mortality.

- CKD – 3 (eGFR <60 ml /min/1.73 m<sup>2</sup>) is found in 65% @ 5yr in patients with Radical Nx. (MSKCC study 60% of patients will have GFR less than 60 ml)
- CVS Mortality 20% @ 5yr in patients with Radical Nx.

**Q. What are the prototypical concepts of Radical Nx?**

**Ans.**

1. Early Ligation of renal artery and vein
2. Nx with Gerota's fascia
3. Removal of ipsilateral Adrenal gland
4. Lymphadenectomy from diaphragm to Aortic bifurcation.

**Q. What is the importance of removing Gerota's fascia in Radical Nx?**

**Ans.** 25% of patient have perinephric fat involvement i.e. 25% of Clinical T<sub>2</sub> will be pT<sub>3A</sub>. (Thompson et al.)

**Q. What are the indications for removal of adrenal gland in Radical Nx?**

**Ans.**

- Upper Polar RCC
- Radiological involvement of RCC
- T3 disease (locally advanced)
- Abnormally palpable adrenal on Sx

**Q. What is the current status of lymphadenectomy in Radical Nx?**

**Ans.**

- Not done routinely. Only if CT Scan shows LN enlargement, Lymphadenectomy is done (that too of enlarged nodes)(Puntuck et al)
- PLEASE READ Michael Blute article – Euro. Urol. 2011 – do LN dissection for high grade and high stage tumours.
- For T1 T2 – No need

**Q. Why routine lymphadenectomy is not indicated?**

**Ans.**

- 1) RCC has a prominent hematogenous route to mets
- 2) Lymphatic drainage is not fixed(trilaminar lymphatic drainage )

**Q. What is the Gold Std incision of Radical Nx?**

**Ans.** Classical approach – extended subcoastal with trans peritoneal approach

**Q. Why Transperitoneal approach?**

**Ans.** To assess visceral mets / liver etc.  
(probably this approach was devised in the era when no CT scans were available, now a days flank approach is also deemed appropriate more over laparoscopic approaches are Transperitoneal too.)

**Q. What is the limitation of flank approach?**

**Ans.**

- Limited exposure
- Difficult lymphadenectomy

## Neeraj Sharma's ...Notes For Urology Practicals

**Q. What are the indications for Lap. Radical Nx?**

- Ans.**
- Tumour size upto 10 cm T<sub>2A</sub>
  - Lymphadenopathy (Manageable)
  - Only Renal vein involvement (Max.)
  - No Local Invasion

- Gill et al.,

**Q. What are the chances of metastasis (Lungs) recurrence in a patient who is undergoing Radical Nx?**

- Ans.**
- For T1 - (7%) remember around **10%** @ 5 yrs  
 For T2 - (21%) remember around **20%** @ 5 yrs  
 For T3 - (35%) remember around **30%** @ 5 yrs  
 Risk increases with tumour stage  
 Risk is maximum within first 3 years post op.

- Anderson Cancer Centre

Stage	chances of metastasis (Lungs)@ 5 years
T-1	10%
T-2	20%
T-3	30%

**Q. What are the other factors (other than recurrence) that mandate close fl/up after radical Nx?**

- Ans.** Kidney function & CKD Risk

**Q. What are the components of fl/up protocol?**

- Ans.**
1. Blood Test – **CLEAR** (Ca<sup>++</sup>, LFTs, Electrolytes, Alk-PO<sub>4</sub>, RFTs)
  2. CXR-PA
  3. CT – Abdomen

**Q. What is the typical fl/up after Radical Nx?**

Ans.	Tumor Stage	Blood CLEAR	CXR	CT Abdominal
I	(0-7cm) localized	@ 12 months	-	-
II	(7-15cm) localized	@ 12 months	@ 12 months	-
III	Renal vein, IVC, Extra-capsules	@ 6 months	@ 6 mo x 3 yrs Then yearly	@ 12 mo. x 3 yrs then @ 2 yrs
IV	Node +	@ 6 months	@ 4 mo x 3 yrs @ 6 mo	@ 6 mo. x 3 yrs then @ 12months

**Q. What is Blute's criterion?**

- Ans.**
- Size > 10cm
  - T-Stage T3 \* T4
  - Necrosis
  - Furman Grade – poor
  - Sarcomatoid features



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **DESCRIBE RADICAL NEPHRECTOMY**

Indication: RCC, Solid enhancing mass  
Not amenable to partial Nx

**Check:** **Side** - **Left Side/ Right Side**

Anaesthesia: G/A

Deploy: Foleys

Position: Supine

Incision: Anterior Extended Subcoastal

- Starting from 11th Rib tip to lateral Border of contralateral rectus muscle
  - 2 Finger breadths below coast margin
- 1) Incision
  - 2) Camper  
Scarpa
    - Cut Ext. oblique laterally and Rectus Sheath medially cut or retract rectus muscle
    - Cut Internal oblique & Transverse abdominis
    - Cut the posterior layer of Rectus sheath
    - Open peritoneum
  3. Do metastatic evaluation, liver, Bowel, peritoneum  
For Right Nephrectomy

4. Reflect the ascending colon medially along the line of Toldt  
(Mobilizing the Rt. colon is called Kettle Brush Maneuvre)

↓

Enter the retroperitoneum

↓

Kidney, Renal vein will be seen

↓

Reflect the duodenum medially (kocherization)

↓

IVC will be seen

↓

Loop the vein RV & retract

↓

RA lies posterior and along superior margin of RV (behind)

↓

Control RA & ligate RA... fl /by renal vein

↓

Mobilize the kidney extra gerota all around

↓

Loop the ureter and cut

↓

Check hemostasis – drain fix – **count mops** – close

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What is different about left Radical Nx?**

**Ans.** Reflect the descending colon from the white line of Toldt. (Mobilizing (left) colon is called mateoux Maneuvre



Complete mobilization of splenic flexure by dissecting the spleno-colic ligament



Left renal vein is dissected and looped



Left Renal Artery is approached through posterior route



Left RA tied from Behind the Kidney



Left Renal vein, the tributaries are tied – adrenal, lumbar, gonadal

**Q. Why left RA is approached posteriorly by flipping the kidney?**

**Ans.** To avoid inadvertent ligation of SMA

**Q. What will you do if renal artery is not seen due to large tumour?**

**Ans.** Control the Rt side RA between Aorta & IVC.

Control the Left side on anterior border of aorta

If it is still not possible, mobilize the kidney and pull it out of field, this will tent up the pedicle.

**Q. What is the relation b/w size of tumour on CT and actual size of tumour?**

**Ans.** CT usually depicts upto 10% enlarged size mass than actual

**Q. What is chevron?**

**Ans.** It is the accessorial sign on an military uniform

**Q. What are the indn for lymphadenectomy in Radical Nx?**

**Ans.**

1. Enlarged LM on CT
2. Locally advanced disease
3. Patient with high risk for nodal metastasis

Presently Blute's criteria is used - Puntuck et al

**Q. What are the complications of Radical Nx?**

<b>Ans.</b>	Intra-operative	Hemorrhage
		Injury – Pleural Injury, Pancreas, spleen, gut
	Post Op.	- early
		Bleeding
		Lymphocele
		Pneumothorax
		Infection
		Ileus
		- Late
		CKD
		Recurrence

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. Describe the thoraco – abdominal approach?**

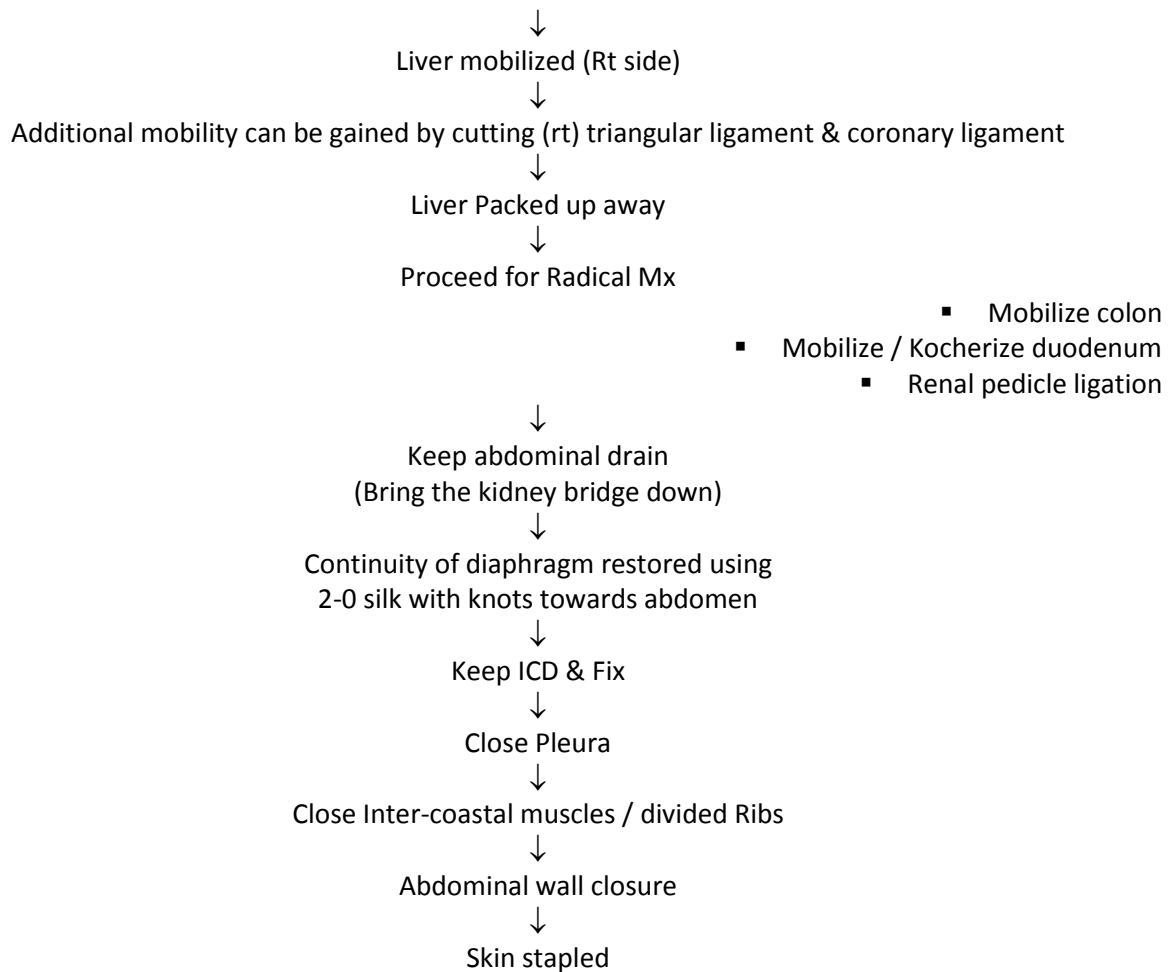
**Ans.** Indication : Large upper polar renal mass  
supra renal mass  
Anaesthesia: G/A  
Deploy: Foleys

**Position:** Semi Oblique flank position  
Lower Limb (as in Classical flank position)  
Pelvic girdle 75° (90° in flank position)  
Check & Shoulder griddle 45° (90° in flank position)  
Ipsilateral arm rested over mayo stand.  
Raise the kidney bridge

**Incision:** From posterior axillary line to umbilicus in the 10<sup>th</sup> intercostal space (b/w 9<sup>th</sup> and 10<sup>th</sup> rib) On the upper Border of 10<sup>th</sup> Rib.

Skin incision runs over the 10<sup>th</sup> Rib upto tip of the rib  
↓  
Incision runs obliquely down to umbilicus (after crossing the tip of the Rib)  
↓  
Subcutaneous tissues are cut  
↓  
Latissimus dorsi and ext. oblique is divided and rib surface exposed  
↓  
Rib surface is incised and periosteum elevated, Rib tip is made free  
↓  
Superior and inferior periosteum elevated using periosteum elevator  
↓  
Doyen rib respiratory slipped into and rib excised using rib cutter.  
Check for spicules  
↓  
Ext. oblique and ant. Rectus sheath opened  
↓  
Rectus abdominis incised  
↓  
Int. Oblique and transverse abdominis cut  
↓  
Peritoneum opened  
↓  
The Bed of the rib is incised and pleura seen  
↓  
Pleura incised and opened (avoid injury to lung)  
↓  
Lung is packed away lightly  
↓  
The diaphragm is incised through the pleura side  
↓  
Incision on diaphragm 2 finger breadths away from chest wall  
(Curvilinear incision)

## **Neeraj Sharma's ...Notes For Urology Practicals**



**Q. What is the specific complication of thoraco-abdominal approach?**

**Ans.** Respiratory complication and morbidity

**Q. Describe the flank approach**

**Ans.** Indication      small Tumour masses

Check the side

Anaesthesia : G/A

Deploy : Foleys

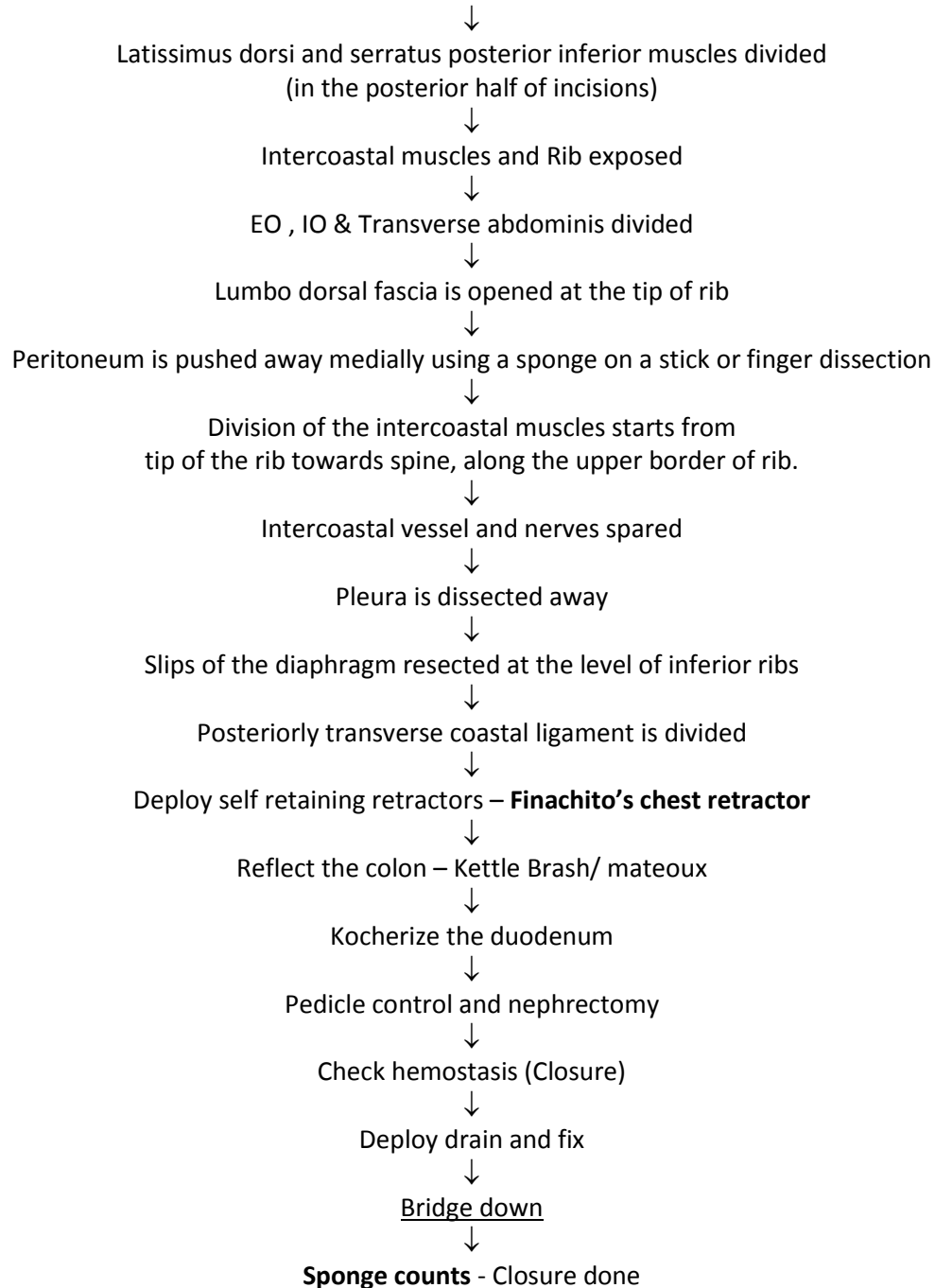
**Position :** Flank position  
Lower leg flexed  
Upper leg extended  
Pillow b/w the legs  
Pelvic girdle 90° to table  
Shoulder girdle 90° to table  
Ipsilateral hand / arm on mayo hand rest across the table  
Support the head  
RAISE THE BRIDGE  
Patient flush to operator's side table margin

## **Neeraj Sharma's ...Notes For Urology Practicals**

Level of raising bridge – tip 12<sup>th</sup> rib tip  
Patient is strapped to table with wide tape  
Make the flank horizontally parallel to ground

### **Incision:**

The incision is made @ the level of 11<sup>th</sup> Rib  
Incision starts from post. Axillary line to lateral border of Rectus abdominis  
Cut the skin and subcutaneous tissues



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What are the levels of pleura and lung at surface marking?**

<b>Ans.</b>	Mid Sternal	Mid Clavicular	Mid Axillary Line	Scapular Line
Lung	6 <sup>th</sup> Rib	8 Rib	10 Rib	12 Rib
Pleura	8	10	12 Rib	T1

### **LET'S REVISE**

- TMM staging 2009
- CT Findings suggestive of IVC thrombus
- Trans-Eso-echo and the role
- Tumor thrombus u/s Blank Thrombus
- Metastatic workup
- SUV values of PET
- 99 Tc labeled Ca9 – PET
- Prognosis of various histological types
- Lymphatic drainage of kidney
- Causes of HTM / anemia / hypercalcemia
- Finachito's chest retractor
- Survival of RCC Patient
- Adrenal Involvement and staging
- Nomograms in Kidney
- Michael Blue L.M. Involvement stage wise
- 25% CT2 –PT3- Thomson et al
- Puntuck et al. – No Need LN removal
- Blute et al – Ind. For L.N, removal
- Gill et al – Ind. For Lap Nx
- Indn. For partial Nx
- Chances of lung mets stagewise
- Kettle Brash Maneoure
- Mateoux Maneoure
- HIF – VEGF Factors
- VHL Screening
- Screening of Ca RCC

**RCC WITH IVC THROMBUS**

**Q. What percent of patient will have IVC thrombus?**

**Ans.** 5 – 10% of RCC patients will have IVC thrombus

**Q. In which patients IVC thrombus should be suspected?**

**Ans.** Patients with :

- lower limb edema
- Caput medusa
- Isolated Rt varicocele
- Non reducible Lt varicocele
- Proteinuria (Max – 2+)
- Rt atrium mass
- Non function ipsilateral kidney

**Q. What are the staging levels of thrombus?**

**Ans.** Morick et al.

Level I : Upto renal vein ostium

Level II : Extending upto lower aspect of Liver

Level III : Retrohepatic

Level IV : Suprahepatic / supradiaphragmatic

■

**Q. What will be the modalities to Investigate for IVC Thrombus?**

**Ans.**

- MRI (Gold Standard)
- C.T. Scan
- USG Doppler
- TEE Trans-esophageal-Echo
- Venocavography

**Q. How will you differentiate b/w tumour thrombi and bland thrombi?**

**Ans.** Tumor thrombi will enhance on contrast MRI T1 Phase/ contrast CECT

**Q. What is the status of Pre-operative Angio embolization in cases of RCC with IVC thrombus?**

**Ans.**

- Renal artery embolization is thought to be helpful in reducing the blood loss from tortuous collateral feeding vessels ,with the advent of new vessel sealing and cautery devices the role of angio-embolization is lost.
- Next proclaimed use of R A angio-embolization is reducing the tumour size and ease of intra operative dissection by the virtue of peripheral inflammatory oedema. The risks and side effects outweigh the benefits
- Pre operative RA Embolization does not provide any benefit in terms of reducing blood loss, reducing complication of Nx. Rather it increases the risk of thrombus emboli and thus cardio - pulmonary events (**Subramanian et al.**)

**Q. What is the famous study for the pre operative renal artery angio embolization?**

**Ans.** Subramanian et al (2009) 225 patients

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What are the advantages of Angio-embolization?**

**Ans.** 1. Reduces the thrombus size  
2. Shrinks the tumour  
3. Early ligation of renal vein is feasible intra operative i.e. before tying artery vein can be ligation first

**Q. What is the status of trans esophageal echo?**

**Ans.** No use – preoperatively  
Useful – Intra operative (only)

**Q. Which approach will you use for RCC with IVC thrombus positive?**

**Ans.** B/I sub-coastal Transperitoneal (Chevron)

**Q. How will you manage level – 1 thrombus?**

**Ans.** Use satinsky clamp

**Q. How will you manage level – II (infra hepatic) thrombus RT side RCC?**

**Ans.** Anaesthesia : G/A                      Check side : Right / Left  
Deploy : Foleys                              Check Blood Reservation

**Incision:** Chevron / Thoraco -abdominal

**Position;** Supine / small pack under flank on ipsilateral side.

**Procedure:** Formal laparotomy is done using chevron incision, inspect the liver / peritoneum

**On Right side:**

- Reflect the ascending colon medially from hepatic flexure
- Curve the incision around caecum and extend along root of mesentery upto ligament of Treitz. Reflect the small bowel away leading to exposure IVC in total with left RA and Left RA.
- Reflect the duodenum (Kocherization done)
- Self retaining Bookwalter/ Thomson's Retraction deployed
- RT .Renal artery is traced, looped in b/w the aorta & IVC. Ligated and cut
- Don't confuse here Right R.A. against – 1) SMA,
- IVC is traced up;
- Right lobe of liver which keeps falling on IVC is retracted and safe guarded.
- As right lobe of liver is retracted a caudate lobe branch of IVC is seen; ligated and cut.
- Porta Hepatis is safe guarded.
- IVC is gently palpated and confirmed that the upper end is free of Tumor
- Trans Esophageal ultrasound / Echo can be done to confirm the level
- IVC looped at this level.
- Opposite renal vein is looped
- IVC inferior to the level of thrombus is looped
- Ureter is cut
- Kidney mobilized extra – Gerota and made to be attached only on the renal vein.
- Flood the patient well with IV fluids, crystalline and colloids ,because After clamping IVC BP will fall
- Trial clamping done and anesthetist is asked if patient is stable. If patient is stable then proceed for sequential clamping.



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Sequential clamping**

- Distal most (Inferior) clamp is applied first
  - It helps in decongesting the IVC and Both renal veins & Kidneys
  - Helps in minimal blood loss
- 2<sup>nd</sup> Clamp is applied on contra-lateral Renal Vein
  - Helps in preventing any other blood loss from this renal Vein.
  - Prevents tumour cell emboli to enter the contralateral renal system.
- 3<sup>rd</sup> clamp is applied on the superior aspect
  - It is applied last so that IVC & contralateral renal Vein are maximally decongested .
  - If applied early causes turbulence of blood flow and thus increase chances of tumour emboli.

### **Venotomy**

- Venotomy is done on Ant. Surface of RV and Kidney along with thrombus is removed.
- Thrombus is removed with gentle downwards traction or milking of IVC
- Intermittently the superior clamp is opened and anesthetist asked to keep positive pressure so that back bleeding is there.
- This Back bleeding helps in flushing out the small tumour particles.
- IVC is repaired using 5 -0 prolene.

### **Opening of clamps**

- Lower most clamp is opened first to see the Status of Repair
- If leak is there the lower most clamp can be re-applied and repair done.
- Proximal (superior) most clamp is opened second provided there was no leak after opening the inferior clamp
- Once the blood flow is regularized through IVC by opening the distal and proximal clamps the contralateral renal vein clamp is removed.

### **Closure:**

- Put a surgical abgel over IVC
- Check homoeostasis
- Drain deployed and fixed
- Closure done.

**Q. What will you do if canal wall invasion is there?**

**Ans.** Resect / excise that portion of IVC wall

**Q. Upto what size of luminal narrowing of IVC has no effect?**

**Ans.** It hardly matters upto 50% of IVC lumen narrowing.

**Q. What types of clamps are used for clamping?**

**Ans.** Upper and lower – satinsky clamps, contralateral Renal vein – Bull dog clamp.

**Q. How will you prevent air embolism in system while closing the IVC?**

**Ans.** Before tying the final closure knot; open the inferior clamp momentarily that will lead to air expulsion out of system. Re-clamp the inferior satinsky and tie the final knot and IVC closure

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What tissue can be used for IVC reconstruction?**

**Ans.**

- Pericardium free graft
- PTFE graft
- Saphenous vein

**Q. In case of IVC extensively studded with tumour thrombus what can be the other option?**

**Ans.**

- Ligation and resection of IVC above the level of renal hilum.(for RT side only )
- In cases of right Radical Nx this can be done as the venous drainage from remaining left kidney and lower limb travel through tributaries of left Renal vein – Gonadal, Adrenal, Phrenic
- In cases of left Radical Nx it **cannot** be done as the remaining right kidney has no other drainage. Right renal auto transplantation can be then done to inferior mesenteric vein .

**Q. Describe the management of level III thrombus?**

**Ans.** Level – III (Retro hepatic) thrombus, requires mobilization of liver and flipping it medially over its vertically axis.

**Q. What is Langen Back maneuver?**

**Ans.** Dividing the Right coronary and Triangular ligaments and flipping the liver medially is known as Langen back maneuver

**Q. What is Triangular ligament?**

**Ans.** Triangle shaped ligament that attaches liver to lateral body wall & diaphragm.  
Right and Left triangular ligaments

**Q. What is coronary ligament?**

**Ans.** It is a peritoneal fold extending From, the centre of the superior surface of the liver, to the under surface of coronary diaphragm (diaphragm on which Heart rests)

**Q. What is falciform ligament?**

**Ans.** From the under surface of liver to umbilicus.

**Q. Where do hepatic veins enter IVC?**

**Ans.** 1 -2 cm below diaphragm

**Q. What will you do if after clamping IVC the patient is not able to maintain BP >60 mm Hg?**

**Ans.**

Option 1: Clamp aorta also below the left RA (usually clamped below IMA)

Option 2: Veno- Veno – Bypass.

**Q. What can you do for level – II thrombus?**

**Ans.**

- Langen Back maneuver and flip the liver
- Proceed for Radical Nx
  - artery controlled
  - Ureter cut
  - Inferior, contralateral, superior Clamps
  - Venotomy & Nx completion

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Tumour Thrombectomy
- IVC closure and clamp release – inferior – superior and C/L Renal

**Q. Will you do cardio pulmonary bypass for Level – III?**

**Ans.** Not needed usually

**Q. What is Miami's operation? (=Florida Op.)**

**Ans.** Also known as Soloway's opn =

- clamp the intrapericardial IVC through the diaphragm
- Although veno – veno bypass is needed but cardiopulmonary complete bypass is avoided.

**Q. How will you manage Level – IV thrombus?**

**Ans.** Level IV thrombus requires cardiopulmonary bypass

**Q. What is the maximum time for which "Pringles" maneuver can be done?**

**Ans.** Pringle maneuver – compression of Porta Hepatis- max time - 10 mins

**Q. Describe the steps of cardio pulmonary Bypass with Nx with IVC thrombectomy level– IV?**

**Ans.** Anaesthesia : G/A

**Deploy:** Foleys

**Induction :** After induction do trans. Esophagus Echo cardiography to assess level.

**Incision:** Chevron

**Steps :** do formal transperitoneal approach

**Exposure:** Mobilize the colon (Kettle Brush Maneuvre)

Mobilize the duodenum (Kocherization)

Langen Back maneuver; reflect the liver.

Ligate renal artery

Mobilize the Kidney well

**Sternotomy :** Extend the incision vertically midline

Cut through midline sternum and expose pericardium

Open pericardium and Right atrial wall so that IVC insertion and SVC insertion are seen.

Dissect the arch of aorta

Check all set to start cardiopulmonary bypass

Time limit – 40 min max

Heparinize the patient

Cannulate the IVC & SVC – these acts as outflow channels and transport blood from body to heart-lung-bypass machine.

**Cannulate the aorta:**

This act as inflow channel & transport blood from bypass machine to body

Pump

Oxygenator

Coolant

- The inflow blood (from machine to body) is cooled to 10°C.
- Head and abdomen are cooled
- Core Temp. of 20°C is achieved in 20 min.

## **Neeraj Sharma's ...Notes For Urology Practicals**

- After core temperature reached 95% of the blood is extracted into the pump leaving usually no blood to supply any organ.
- State of hypothermic circulatory arrest
- Anterior cavotomy done
- Atrium opened
- Thrombus removed and nephrectomy done
- Fogarty catheter pushed from atrium to renal vein to remove last bits of thrombus.

### **Closure:**

- Cavotomy closed
- Atrium closed
- Rewarming done, cannula removed
- Abdominal closure, chest tubes deployed
- Protamine is given to counter heparin Action.

Patient extubated in ICU and not in OT

**Q. If there is IVC thrombus and lung mets what will you do?**

**Ans.** Cyto reductive nephrectomy with IVC thrombectomy

## Neeraj Sharma's ...Notes For Urology Practicals

### PARTIAL NEPHRECTOMY

**Q. What is RENAL nephrometric score?**

**Ans.** R.E.N.A.L. Nephrometry is a scoring system which describes the complexity for doing Partial Mx for a given renal mass.

R	-	radial diameter (in cm)
E	-	Exophytic / endophytic
N	-	Nearness to Hilum (in mm)
A	-	Anterior / Posterior
L	-	Location w.r.t. pelvic lines.

**Q How is the scoring done?**

**Ans.** R, E, N and L are given pts 1 to 3  
'A' is just Anterior (A) / Posterior (P)

	<u>1 pt</u>	<u>2 pt</u>	<u>3 pt</u>
<u>R</u>	< 4 cm	4-7 Cm	> 7 cm
<u>EXO</u>	> 50%	<50%	Complete endophytic
<u>N</u>	> 7 mm	7-4 mm	< 4 mm
<u>A</u>	A/P		
<u>L</u>	Located away from polar line	Crosses Polar line	≥ 50% inside the polar lines.
	<u>Score</u>	<u>Complexity</u>	
	4,5,6	Low	
	7,8,9	Intermediate	
	10,11,12	high	

**Q. What are the other nephrometric scores?**

		1	2	3	
Ans.	DAP	Diameter	< 2.4 cm	2.4-4.4	>4.11 cm
		Axial	> 1.5 cm	<1.5 cm	touched

Polarity in polar line	> 2 cm	< 2 cm	Crossed
------------------------	--------	--------	---------

**PADUA** Pre operative Aspects and Dimensions Used for Anatomical classification  
**C-index** Centrality index

**Q. What does these score depict?**

- These score depict the level of difficulty and eventual success in doing 80 of partial Nephrectomy esp. By Lap/Robotic.
- These score hardly matters for open Sx but still are applicable to open Surgeries also.

---

## ***partial Nephrectomy operative procedure***

---

### **Indications:**

- Any T1 (0- 7 cm) even with normal functioning contralateral kidney.
- If Contralateral kidney is threatened / affected by stone / VURD / CKD / HTN

### **Contra indications for partial Nx**

- Nodal mets positive
- IVC thrombus / Renal vein thrombus positive
- PC system involvement
- Renal hilar involvement

**Wheel in** : check side –right /left.

**Anaesthesia** : G/A

**Deploy** : RGC Catheter + Foleys

**Position** : Lateral flank position

**Approach** : Extra-pleural, extra-peritoneal flank

**Incision** : 11<sup>th</sup> Rib tip incision (as per X-ray kub)

### **Procedure:**

- Open the retroperitoneal space
- Loop the ureter : Deploy self retaining retractor
- Dissect the hilum
- Loop the artery and vein
- Start mannitol (20% in 100ml) so 300 ml - 60 mg
- Remove the perinephric fat around the normal parts of kidney
- Don't remove the perinephric fat over tumour
- Clamp the artery with bull dog clamp
- Cut a hole a plastic sheath and place kidney into it
- Put ice slush all around for 15 min
- By this time get the cautery connections checked
  - 4 – 0 vicryl sutures – ready
  - 2 – 0 vicryl sutures – ready
  - Suction ready
  - Abgel + surgical bolster
- Time up – displace the ice
- Mark the tumor and excise with cautery
- Visible open blood vessels are sutured with figure of 8 sutures
- Send for frozen section – NO NEED (we in our institute do not send )
- Push 10ml methylene blue 1:1 diluted through RGC
- If any calyceal system opening is seen – close it
- Frozen section negative (if sent for frozen )
- Close kidney over bolster using vicryl. 2-0
- Release clamp

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Hemostasis achieved
- Kidney fixed to posterior musculature to avoid flipping
- Drain kept & fixed
- Check Counts correction
- Close

**Q. What are the pre – op preparation for partial nephrectomy?**

**Ans.** Consent  
CT angio  
PRC reservation  
Morning dose antibiotics  
Site marking  
**Order for ICE shush : ETO / autoclaved plastic sheath**

**Q. What are the major steps in partial Nx?**

<b>Ans.</b>	1) Site Marking	6) ICE slush
	2) Cysto + RGC	7) Check with methylene blue
	3) Flank Position	8) Bolster
	4) Mannitol	9) Bridge down
	5) Clamp artery	10) Counts correct

**Q. What are other ways (Other than Renal artery clamping) to achieve partial Mx?**

**Ans.** Total Non-clamping  
Zero ischemia – 20 min with warm ischemia  
Segmental arterial clamping (I.B.Singh et al.)

**Q. What is disadvantage of RA clamping?**

**Ans.** Ischemic injury  
Clamp causes Renal artery intima damage

**Q. In case of B/I tumours which side will you operate first?**

**Ans.** Easily resectable tumour first fl/by difficult (4-6 week wait for 2<sup>nd</sup> sitting)

**Q. What is the strength of mannitol given?**

**Ans.** 20% mannitol @ 1 mg / Kg – 15 minutes before

**Q. What clamp is used for RA clamping?**

**Ans.** Bull Dog

**Q. Do you clamp the renal vein?**

**Ans.** NO - it decreases renal ischemia by allowing back flow

**Q. When will you clamp renal vein also?**

**Ans.** In patients with centrally located tumour to minimize bleeding.

**Q. Upto what time safe cold ischemia can be obtained?**

**Ans.** 90 min., although upto to 3 hrs permanent renal injury does not occur

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. Is there any other method to do core cooling?**

**Ans.** Cold NS irrigation through RGC  
Cold solution instilled through Renal Artery

**Q. What is the status of "Cold Solution instilled via RA"?**

**Ans.** Not used Because:

1. Can cause systemic hypothermia
2. Risks tumour dissemination
3. May require RA arteriotomy repair

**Q. What should be the tumour margin for resection?**

**Ans.** Doesn't matter as long as it is tumour free margin

**Q. What is the role of intra-op USG?**

**Ans.** Identifies / defines tumour lesion better

**Q. While doing partial nephrectomy, If on initial exploration lymph node is found: what will you do?**

**Ans.** Convert the surgery into Radical Nx  
Partial Nx is contra-indicated with lymph node positive status.

**Q. Which is M/c segmental artery at risk to get injured while doing upper transverse resection?**

**Ans.** Posterior segmental renal artery

**Q. When will you do enucleation?**

**Ans.** Selected patients : VHL  
Multiple low grade tumours  
Majorly exophytic growth

**Q. What is the dis-advantages in this technique?**

**Ans.** Chances of margin positivity is high

**Q. What are the complications of partial Nx?**

**Ans.** Intraop – hemorrhage  
Post. Op      Bleeding  
                 Infection  
                 Urinary fistula  
                 Ureteric Obstruction  
Late            HTN  
                 Tumour recurrence  
                 Aneurysm, pseudo aneurysm  
                 AV fistula



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. How will you manage post-Op bleeding?**

**Ans.** Complete bed rest  
Pulse BP monitoring  
Blood replacement  
Angiography – angio-embolism

**Q. What can cause ureteric obstruction?**

**Ans.** Clots

**Q. What are the risk factors for urinary fistula?**

**Ans.** Central tumour  
Large tumour  
Major reconstructions of PC system done

**Q. What is the Mx of urinary fistula?**

**Ans.** Prophylactic Antibiotics and drain  
DJ Stent  
Rarely Nephrectomy is required.

**Q. What is polar nephrectomy?**

**Ans.** Removal of one pole of kidney-upper or lower pole  
Dissect & Ligate the segmental artery

**Q. What is the minimal renal mass that should be left behind to prevent ESRD?**

**Ans.** 20% of atleast one kidney

**Q. What is the local recurrence after partial Mx?**

**Ans.** 1 – 2% for T<sub>1A</sub> -- Mostly due to multifocal microscopic  
3 – 4% for T<sub>1B</sub> -- Mostly due to margin positive microscopic

**Q. What are the chances of recurrence in opp. Kidney?**

**Ans.** 1 - 2%

**Q. What are the chances of local recurrence / distant mets in RCC?**

<b>Ans.</b>	<b>LR</b>	<b>Distance Mets</b>
T1	1 – 2%	5 – 6%
T2	3 – 4%	7 – 8%

**Q. What is the peak time of recurrence?**

**Ans.** 2 – 3yrs

**ALTERNATIVE THERAPIES**

**Q. What are the alternative therapies for RCC?**

**Ans.** Thermal ablative procedures –

- Cryo surgery (cryo Sx)
- Radio frequency ablation (RFA)

**Q. What are the indications for thermal ablative procedures?**

**Ans.** Patient with local recurrence after partial Nx

Patients having hereditary RCC

Advance Age

Patients not fit for Sx

Size < 4.0 cm

**Q. What is the mechanism behind cryo Rx?**

**Ans.** Freeze thaw cycle

Rapid Freezing and gradual thawing – repeat cycle

Extra cellular Ice



Extra Cellular Hyper OSM(osmolarity)



Movement of intracellular fluid out of cell causing Intra cellular hyper OSM



Intra cellular ice Crystals

Micro-thrombi in vessels

**Q. What is the temperature in the centre of ice ball?**

**Ans.** -40°C

**Q. What are the limitations of energy ablation Sx?**

**Ans.** Need stringent fl/ up

long term outcomes awaited

10% recurrence rates.

**Q. How is the lesion monitored intra –operatively?.**

**Ans.** USG guidance

**Q. What factors depict successful energy ablation?**

**Ans.** Regression of Size in lesion on fl/up CT

Non enhancement of lesion on fl/up CT

**Q. What is the status of Renal Biopsy in patient to be managed with energy ablation?**

**Ans.** Should be done to know the histopathological subtype of RCC before energy ablation

Post energy ablation positive biopsy depicts failure of operation But negative biopsy means nothing.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What is RFA?**

**Ans.** Radio-frequency Ablation  
Radio frequency antennae causes heat production which lead to cell death

**Q. What are the temperature effect on cells?**

**Ans.** +45°C irreversible cell damage  
+55°C leads to cell death

**Q. What are the typical disadvantages of RFA?**

**Ans.**

- Lack of histological proof
- Lack of real time monitoring
- 20% recurrence rate
- 

**Q. How can you enhance efficiency of RFA?**

**Ans.** Multi-prong needle  
Simultaneous Cooling of electrode  
Occlusion of renal artery ( to prevent Heat sinking effect)

**Q. Which laser can be used for laser ablation of Bed (Tumor Bed)?**

**Ans.** Argon laser  
Ho : YAG  
ND : YAG

**Q. What are the local recurrence rates after cryo and RFA?**

**Ans.** Cryo – 10%  
RFA – 20%

**LOCAL RECURRENCE AFTER RADICAL Nx / PARTIAL Nx**

**Q. What is the rate of local recurrence after Radical Nx?**

**Ans.** <2%

**Q. What are the risk factors for local recurrence?**

**Ans.**

- Advanced T stage
- Nodal Positivity
- Undifferentiated Ca

**Q. What will you do for local recurrence after Radical Nx?**

**Ans.** Surgical resection is Best (Only) option usually requiring removal of adjacent involved organs.

**Q. How can you predict survival in such patients?**

**Ans.** Moetzer's criteria

**Q. What is usually the basis behind local recurrence after partial Nx?**

**Ans.** Microsatellite lesion

**Q. What are the options for isolated local recurrence after partial Nx?**

**Ans.**

- Repeat Partial Nx,
- Radical Nx(especially if the resected specimen is high grade tumour)
- Thermal ablation,
- **Active surveillance is best in this setting** (especially if the resected specimen is low grade tumour)

**Q. What can be done for margin positive after radical Nx for T<sub>2</sub>?**

**Ans.** Active surveillance  
RFA  
Re-do-excision

**LET'S REVISE**

- Stages of thrombus – Movick et al.
- Angio embolize study – Subramanian Et al.
- Sequential clamping
- Langen Back maneuver
- 60 mm by minimum pressure for clamping IVC
- Miami's / Florida Operation
- Pringle Maneoure
- Ischemic time old – 90 min
- Complication of partial Nx
- Chances of local recurrence
- FI/ up after Radical Nx / partial Nx
- H1Fu / cryo / RFA
- Micro satellite lesion and partial Nx
- B/d of large palpable mass
- Cysterna chylli and anatomy
- Azygous and hemi Azygous system
- STAR trial
- ASSURE Trial

**Local invasive renal cell cancer**

**Q. What is the presentation of T4 RCC?**

**Ans.**

- Pain due to invasion of Posterior abdominal wall
- pain due to nerve roots
- Colon / liver infiltration
- Weight Loss

**Q: What are the D/ds for Large palpable abdominal mass?**

**A:**

- RCC
- Adrenocortical Ca of Adrenal
- Sarcoma
- XGP
- Ca colon
- Lymphoma
- 

**Q. What is the incidence of T4 RCC?**

**Ans.** 1 – 5%

**Q. Which is m/c organ involved in T<sub>4</sub> RCC?**

**Ans.** Adrenal

**Q. Which is more common-- direct invasion into liver or intrahepatic mets?**

**Ans.** Intrahepatic mets

**Q. What are the D/ds for upper quadrant masses?**

**Ans.**

- Locally invasive RCC
- Adrenocortical carcinoma
- Infiltrative TCC
- Retroperitoneal sarcoma
- Lymphoma
- Colonic carcinoma
- 

**Q. What is the choice of Ix?**

**Ans.** CECT

**Q. What is the status of Biopsy?**

**Ans.** Should be done to rule out lymphoma and prognosticate the tumour

**Q. What is the management for T<sub>4</sub> RCC?**

**Ans.** Complete en-block resection of invaded organs including spleen, colon, abdominal wall muscle etc.(which ever organ is involved)

**Q. What vaccinations are necessary before doing splenectomy?**

**Ans.**

- Pneumovac
- H. influenza
- N.Meningitis

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What is the status of Radiotherapy in locally advanced RCC?**

**Ans.** NO Use  
Pre. Op – Neo adjuvant Radio therapy – NO use  
Post Op. adjuvant radiotherapy – NO use

**Q. Why is radiotherapy not given in RCC?**

**Ans.** 1) RCC is radio resistant  
2) high GI toxicity due to proximity of small bowel and large bowel to kidney

**Q. For Clinical T4; if mass is found unresectable or couldn't be resected completely; what can be done post operatively?**

**Ans.** Systemic chemotherapeutic agents

- For residual tumour
- For margin positive
- For local recurrence (along with cryo/RFA)

**Q. What are the famous adjuvant Rx trials in RCC?**

**Ans.** STAR : Sunitinib Trial in Adjuvant RCC  
Ongoing Phase III Sunitinib  
SOURCE : Sorafenib for resected renal cell carcinoma evaluation.  
ASSURE : Adjuvant Sorafenib or Sunitinib for unfavorable RCC evaluation

**Q. What are the M/c secondary's to Kidney?**

**Ans.** Oat cell carcinoma of lung

**Q. In an asymptomatic patient with lesion in chest and kidney, how can you tell which is primary and which is secondary?**

**Ans.**

- Take biopsy from Kidney / lung lesions pre-op.
- Do Nx and see HPEx report with immune histochemistry
- If primary is lung – multiple / bilateral lesion in kidney and single large lesion in lung
- If primary in Kidney – Multiple small/ Bilateral lesion in lung and single large lesion in Kidney

**Q. What is the trilaminar lymphatic flow of kidney?**

**Ans.** 1<sup>st</sup> Lamina - lies within renal parenchyma  
2<sup>nd</sup> Lamina - lies @ subcapsular level  
3<sup>rd</sup> Lamina - lies in perinephric fat  
These then eventually converge along the renal vessels to the lateral aortic nodes

**Q. What is the lymphatic drainage of kidney?**

**Ans.**

Trilaminar lymphatics  
↓  
Lateral aortic LN  
↓  
Lumbar trunks  
↓  
Intestinal trunks (from stomach, intestine, pancreas, spleen)

## **Neeraj Sharma's ...Notes For Urology Practicals**



### **Cisterna chyli**

Cisterna chyli is a dilated sac at the lower end of thoracic duct. It receives fatty chyle from intestinal trunks – short circuiting or obstruction leads to chyluria

**Q. Where is Cisterna chyli located?**

**Ans.** Behind the aorta and in front of lumbar bodies level - L1 & L2

**Q. What is thoracic duct?**

**Ans.** Thoracic duct arises from Cisterna chyli  
Passes through aortic opening of diaphragm  
Ends at the junction of left subclavian and int. jug vein.

**Q. What is Azygous & Hemi Azygous venous system?**

**Ans.**

- Azygous vein is on right side
- Hemiazygous is on left side
- Azygous vein is a vein which connect infra-renal IVC to the SVC
- Azygous vein is formed by union of Rt. ascending lumbar vein with Right subcoastal vein. Azygous then runs in Right side thorax, arches over right main bronchus and eventually joins superior vena cava.
- Hemiazygous is formed by union of left ascending lumbar vein with left subcoastal. Hemiazygous then crosses to the left side and drains into main Azygous vein

**Q. What is the Virchow's L.N.?**

**Ans.** Left supra Clavicular L.N. is called Virchow's L.N.  
It is involved due to spread of micromets via thoracic duct  
Retrograde spread from thoracic duct to subclavian leads to Virchow's L.N.

### **METASTATIC RCC MANAGEMENT**

**Q. What % newly diagnosed cases of RCC will have synchronous RCC mets?**

**Ans.** Less than One third (33%)

**Q. What % of newly diagnosed cases of Localized RCC will eventually from mets some day?**

**Ans.** (33%) (20-40%)

**Q. What is the prognosis for M<sub>1</sub> disease?**

**Ans.** 5 Year survival is 5% (0-10%)

**Q. What are favorable factors for metastatectomy?**

**Ans.**

- Age < 60 Yr.
- Site- Pulmonary



## **Neeraj Sharma's ...Notes For Urology Practicals**

- Size < 4cm
- Solitary mets

**Q. How will you prognosticate the patient with RCC mets?**

Factor (pneumonic <b>LACK of Nx</b> )	Score
<b>L</b> DH more than 1.5 times of normal	1
<b>A</b> naemic (Less than lower limit of normal)	1
<b>C</b> a <sup>++</sup> Corrected (> 10 mg / dl)	1
<b>K</b> arnofsky score of < 80%	1
<b>N</b> ephrectomy (Nx) not done	1
(some criteria table consider Time from Nx to metastasis)	
Total	0-5

**Q. What are these prognostic criteria known as?**

**Ans.** MSKCC / Moetzer's Criteria

**Q. Where else Moetzer's Criteria work?**

**Ans.** Ca Tests

**Q. What does Moetzer's Criteria depict for Survival?**

Risk Group	No. of Adverse Factors (Score)	Median Survival
Good	0	20 Months
Intermediate	1-2	10 Months
Poor	3, 4, 5	04 Months

**Q. What is the nut shell summary of Moetzer's Criteria?**

**Ans.** Maximum survival of any patient with RCC mets (T<sub>any</sub> N<sub>any</sub> M<sub>1</sub>) will be roughly 20 months; when On his best (0' Zero' prognostic factors)

**Q. What are the basic principles of M<sub>x</sub> of metastatic RCC?**

- Ans.**
- (1) Risk assessment
  - (2) Performance status
  - (3) Nephrectomy (cytoreductive Nx)
  - (4) Immune therapy
  - (5) Targeted therapy

**Q. What is the status of Cyto reductive Nephrectomy (Nx)?**

**Ans.** If feasible; should be done  
Cyto reductive Nx is must before immune therapy- IL2 , INF- $\alpha$   
Cytoreductive Nx is not necessary before Targeted therapy.

**Q. What is the Trials basis for doing Cyto Reductive Nx?**

**Ans.** SWOG } O/S improved by 11.1 months in Cytoreductive + INF $\alpha$   
EORTC }

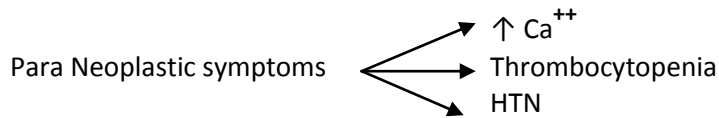
## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What is the status of metastatectomy?**

**Ans.** Excision of solitary pulmonary mets is widely accepted practice.

**Q. What are the indications for palliative Nx?**

**Ans.** Intractable Pain  
Intractable hematuria  
Constitutional Symptoms



**Q. What are the major sites of metastasis?**

**Ans.** lung, Bone, Brain, Liver

**Q. What will you do for patient with poor performance score?**

**Ans.** Symptomatic management only.

**Q. What will you go for immunotherapy?**

**Ans.** In patients with multiple metastases, who have good performance status.

**Q. What are the contra-indications for Cytoreductive Nx + Cytokinins?**

- .Poor Performance Status
- metastasis to critical areas (CNS, spinal Cord)
- Significant co-morbidity.

**Q. What is ECOG performance score?**

**Ans.**

0	-	Fully active with Strenuous Activity
1	-	Active but without strenuous Activity
2	-	Ambulatory with self care
3	-	Ambulation limited, self care limited.
4	-	Confined to Bed
5	-	Dead

**Q. What is ECOG?**

**Ans.** Eastern Co-operative Oncology Group

**Q. What is the difference between active and Ambulatory?**

**Ans.** Active is able to carry out various activities like swimming /driving / jumping / Running.

- Ambulatory is limited to only slow walking.

**Q. What is Karnofsky's performance score?**

- 100 – full normal
- 0 – Dead



## **Neeraj Sharma's ...Notes For Urology Practicals**

- |              |  |
|--------------|--|
|              | No special care required                               |
| ○ 70,60,50 - | Self care +ve, personal needs +ve but not able to work |
| ○ 40,30,20 - | Require help even in self care                         |
| ○ 10,0 -     | moribund & dead  |

**Q. What are the factors determining favorable outcome for patient undergoing Cytoreductive surgery?**

**Ans.**

- Solitary pulm. Mets.
- sixty years or less
- Size < 4 cm
- Site pulmonary

**Q. How can cytoreductive nephrectomy (C.Nx.) improve the outcome?**

**Ans.** Primary tumour suppresses the T-cell activation  
Mx allows better immune response  
Mx changes the biological environment around tumour

**Q. What is the Biggest trial that Supported cytoreductive Mx (CM)**

**Ans.** SWOG

**Q. What is the status of C.Nx. before Targeted therapy?**

**Ans.** Doubtful; No data exists.

**Q. What is the status of metastatectomy?**

**Ans.** Better, if done.

**Q. What is progress free survival?**

**Ans.** The time duration (after starting a drug) for which disease does not deteriorate.

**INTERFERONS**

**Q. What are interferons?**

**Ans.** Group of proteins with antiviral, Anti-proliferative & Immuno modulatory properties.

**Q. What is dose of INF- $\alpha$ ?**

**Ans.** Start with 5 million ( $5 \times 10^6$ ) I.U./m<sup>2</sup>, 3 times a wk,  
Escalate upto  $18 \times 10^6$  IU / m<sup>2</sup> x 3 times a wk (subcutaneous)  
Total duration 12 wk.  
Wk-1  $5 \times 10^6$  I.U. / m<sup>2</sup> Mon, Wed, Fri (S/c)  
Wk-2-12 full dose.

**Q. What is the survival advantage?**

**Ans.** Around 3-4 months.

**Q. What are the side effects of INF- $\alpha$  ?**

**Ans.** Flu like features, fever, sweat, myalgia, Nausea, Anorexia. SIRS

**Q. When can we start Immunotherapy INF- $\alpha$  / IL<sub>2</sub> after cytoreductive Nx?**

**Ans.** Within 4 weeks of Sx.

**Q. What is the status of IFN –  $\alpha$ ?**

**Ans.** Beneficial but limited benefits (3-4months)

**Q. What is the response rate?**

**Ans.** 10-15% response  
Complete response in less than 2%

**Q. What is the status of IFN- $\alpha$ ?**

**Ans.** Used always with Bevacizumab  
Rarely used now a days  
May be used for MSKCC 'O' score in treatment naive group

---

**INTERLEUKINS**

**Q. What are Interleukins?**

**Ans.** T-Cell growth factors / Cytokinins which signal growth & proliferation of cytotoxic T cells, NK Cells, Macrophages.

**Q. How is IL-2 administered?**

**Ans.** I.V. Bolus/I.V. Injection  
(INF- $\alpha$  is administered subcutaneously)

**Q. What is the dose of IL-2?**

**Ans.**

- 7,20,000 I.U. / Kg (B.W.) x 8 hourly for (15) doses given over 5 days
- (Give lasix in between 2 doses) with Resp. monitoring & resp. Spirometry exercises.
- Admit the patient in ICU /ward with close monitoring and ECG.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What are the side effects?**

**Ans.** Vascular leak syndrome (give vasopressors)  
Third space fluid collection (Rx Lasix is given between two doses)  
Respiratory Compromise (Triflow Exercises and Spirometry)

**Q. What is the response rate of IL-2?**

**Ans.** 10-15% (same as IFN- $\alpha$ )  
Complete response 9% (2% from IFN- $\alpha$ )

**Q. What is the status of IL-2 in RCC mets?**

**Ans.** US – FDA approved high dose IL-2, that is-- 7, 20,000 unit/kg x 8 Hrly x 12-15 doses.  
Duration of response is upto 3 years.

**Q. Can we continue IFN- $\alpha$  and IL-2 both?**

**Ans.** No, very high toxicity.

**Q. Which patients are particularly benefited with IL-2 therapy?**

**Ans.**

- Post Nephrectomy
- Good ECOG = 0,1
- Pulmonary mets
- Clear Cell Ca.

**Q. Which patients are least benefitted by IL-2 therapy?**

**Ans.**

- Without nephrectomy,
- poor ECOG > 2
- Liver mets (non-pulm. mets),
- Non. clear Cell Ca.

**Q. What is the dosage schedule of IL-2?**

**Ans.** Admit the patient in ICU,  
Do Baseline LFTs/RFTs/Electrolytes  
7, 20,000 I.U./ Kg..... I.V. Inj<sup>n</sup>  
Inj<sup>n</sup> @ 8 hrly from day 1 to day 5 (= 14 Inj<sup>n</sup>)  
Discharge after 24 hrs of last dose injection  
gap of 10 days.  
Repeat cycle i.e. Admit in ICU And Inj .@ 8 hrly from day 15 today 20( = 14 Inj<sup>n</sup>)  
gap of 10 days.  
Cycle (1) = 2 Treatment sessions.

- Total 4 cycles (= 8 treatment sessions)
- gap to 10 ds between two treatment sessions
- Cost of one cycle = Rs 6 lakhs.
- IL<sub>2</sub> can be only be given in patients ECOG score 0, 1 and age less than 50 years.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What are the most common side effects of IL<sub>2</sub>?**

**Ans.**

- LFT's will go sky high
- RFT-Sr. Creat will go in range of 6-8 mg/dl.

**Q. What is the disadv. of IL<sub>2</sub> therapy?**

**Ans.** Side effects are more, mortality upto 5%

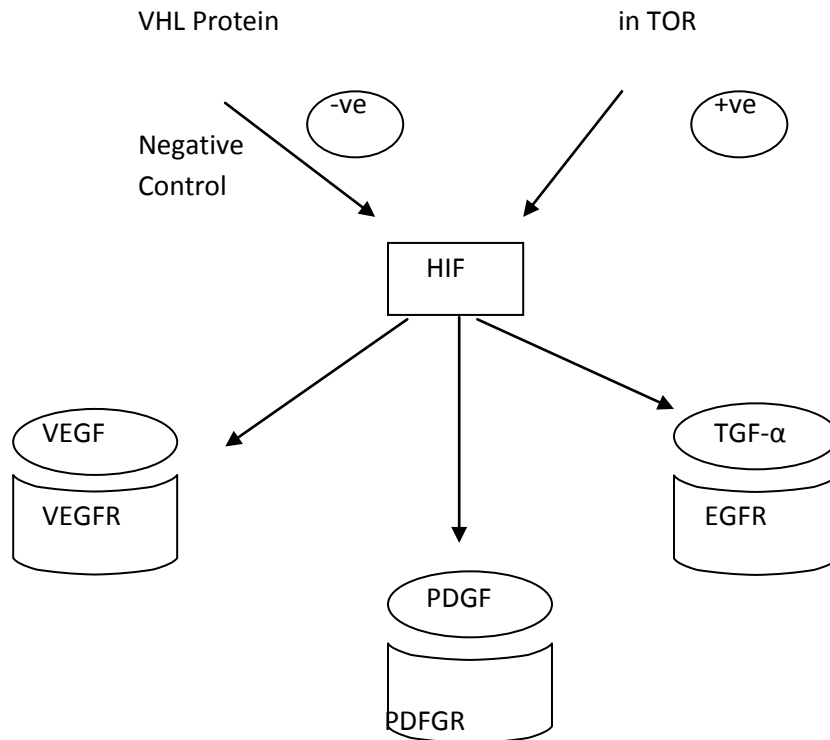
**Q. What is the status of IL<sub>2</sub> today?**

**Ans.** Not used, rarely in a very selective patients with MSKCC Score 'O' & good organ fn.

**TARGETTED MOLECULAR AGENTS IN RCC**

**Q. What is the VHL activity pathway?**

**Ans.**



- HIF is the Basic Culprit Factor which stimulates various kinds of growth receptors.
- HIF is under inhibitory Control of VHL
- Loss/Mutation of VHL leads to stimulation of HIF
- HIF can be directly stimulated through m-TOR.

**Q. What are the various Target agents?**

**Ans.** Sunitinib Rs.47, 000 for 1 month (50 mg) capsules (28)

Sorafenib Rs.9,000/ per month.

Axitinib

*Bevacizumab (Avastin)*

Pazopanib (White long tablets, like combiflam) Rs. 80,000/- month for 800 mg tab.

Everolimus – Rs.40,000/- month for 10mg / ds

Temsirolimus – Rs. 80,000/- per Inj. per dose IV 25 mg.

# Sunitinib



**Q. What is the Gold Std. Management for metastatic RCC?**

**Ans.** Sunitinib

**Q. When (after how many days) will you start Sunitinib after cytoreductive nephrectomy?**

**Ans.** Sunitinib should be started 14 ds after cytoreductive Nx (if done)

**Q. What special investigations that you will see before starting target therapy?**

**Ans.** Check thyroid functions / HTN

**Q. What is Sunitinib?**

**Ans.** Sunitinib is oral receptor kinase inhibitor.  
Dual inhibitor against VEGFR & PDGFR

**Q. What is the dosage schedule for sunitinib?**

**Ans.** 50 mg OD for 4 wks fl/by 2wks off. (give as long as patient can take)  
Sutent (Pfizer) Rs. 47,000 for 1 month therapy – 28 capsules.

**Q. What is the Benefit?**

**Ans.** Progress free survival of 11 months.  
Overall survival benefit is of 5 months.

**Q. What is the Famous Trial?**

**Ans.** Moetzer et. al. 1<sup>st</sup> completed successful human Trial was Published in 2007. NEJM  
Sunitinib V/S IFN- $\alpha$

**Q. What are the side effects of Sunitinib?**

**Ans.**

- Fatigue
- Hand foot syndrome (use Hahoos Cream / KMnO<sub>4</sub> prophylactically)
- HTN
- Tumour lysis Syndrome



## **Neeraj Sharma's ...Notes For Urology Practicals**

- rash, pruritis Skins discoloration ,Yellow discoloration of skins
- BMD,
- Hypothyroidism (sunitinib only)
- Mucositis (diarrhea)

**Q. Which drugs will interact & decrease the effect of sunitinib?**

**Ans.** CYP 450 stimulators will decrease the effect of sunitinib.

- Phenytoin
- Rifampicin
- Quinidine

(CYP 450 Inhibitors are-Isoniazid, ketoconazole Erythromycin, sulfonamides)

**Q. What is the status of sunitinib?**

**Ans.** Gold Standard; 1<sup>st</sup> Line of Drug.

Drug	Type	Dose	ADR	Result	Status
Bevacizumab	Humanized Monoclonal Antibody Agent VEGF	10 mg/ kg I.V. every 2 wks	epistaxis Rectal Bleeding, Bleeding Disorders, Protein urea	5 months survival benefit	1 <sup>st</sup> line option for low Risk pt. in Comb with IFN- α
Sunitinib	Oral VEGFR receptor kinase inhibitor against VEGFR PDGF – Dual Blocker	50 mg OD 4 wks on 2wks off	Hand feet syndrome HTN, fatigue BMD Hypothyroidism	PFS-11 months O.S-26 months	most widely used 1 <sup>st</sup> line Mx

**Q How will you decide whether a solid tumour is responding to a therapy or not?**

**Ans. Recist Criteria**

1. More than 30% reduction in size.
2. Reduction in density on CECT or intensity or MRI

**Q When will you do Thyroid Profile in a patient taking TKI?**

**Ans.**

- Hypothyroidism occurs with sunitinib only.
- One baseline value
- T<sub>3</sub>-T<sub>4</sub> TSH should be done every 2-3 cycles of TKI

**Q What is the status of Neo Adjuvant Sunitinib?**

**Ans.** Can be tried

- 4-8 wk sunitinib can be tried Before Cyto reductive Nx
- Decreases Tumour Volume in less than 10% pts by 10% volume
- Decreases Thrombus extent by one level
- No Benefit in overall Survival

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. What is the relation of HTN & TKI agents?**

**Ans.**

- TKI agents (Sorafenib, sunitinib, Axitinib, Pazopanib) all cause HTN)
- Due to increased peripheral vasoconstriction
- due to nitric Oxide stimulation & Prostacyclin
- 25% of patients will get HTN
- BP more than 160/90 is a contra-indication for TKI
- In patients with TKI related HTN, do not give CCB(calcium channel blockers) as both TKI & CCB get metabolize in liver.
  - Campbell and Morick –Trial 2008

**Q. Which is better Tolerated Sunitinib or Pazopanib?**

**Ans.**

- Pazopanib is Better Tolerated
- Less skin side effects/less hypothyroid / less fatigue
- diarrhea is less with Sunitinib

**Q. Is sunitinib a tablet or capsule?**

**Ans.** Orange colored capsule (Sutent) (Pfizer) roughly around Rs43000/month

**Q. What is Sorafenib?**

**Ans.** Oral Recp kinase inhibitor; dual inhibitor VEGFR & PDGF

**Q. What is the dosing schedule?**

**Ans.** 400 mg BD x 12 wks. Empty stomach. (Tablet)  
Nexavar® 200mg ( 2 Tablets) morning & 2 tablets in evening.



**Q. What are the results / Benefits?**

**Ans.** Progression Free Survival 5.5 months (half to that of sunitinib)  
Overall Survival Benefit is 2.5 months.

**Q. What is the status of Sorafenib?**

**Ans.** Second line Rx agent, when sunitinib fails

***Neeraj Sharma's ...Notes For Urology Practicals***

**Q. What is the cost of Sorafenib?**

**Ans.** NEXAVAR Tablet- 200 mg / 60 Tab = Rs 1,40,000

SURANIB (Cipla)	200 mg x 30 Tablet	= Rs 1700
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200 mg x 60 Tablet = Rs 3000

In March 2012, India stripped Bayer of its exclusive rights to sell Nexavar granting Natco Pharma a license to sell the generic drug at Rs.8,880 (\$170) for a monthly dose. Bayer sells the branded Nexavar at Rs.2.84 lakhs a month.

**Q. What is the status of Sorafenib?**

**Ans.** Initially described as 2<sup>nd</sup> live drug after sunitinib failure (PFS-5.5 months)

Now replaced by Axitinib

Everolimus is now drug of choice after sunitinib failure.

## Axitinib is now drug of choice after Temsirolimus failure

**Q . What is hand feet disease after use of sunitinib/ Sorafenib?**

A.



	Findings	Suggested treatment
<b><u>Grade 1</u></b>	Minimal skin changes or dermatitis (e.g., erythema) without pain	Continue the treatment and consider topical therapy(Hafoos cream) for symptomatic relief
<b><u>Grade 2</u></b>	Skin changes (e.g., peeling, blisters, bleeding, and edema) or pain not interfering with function	Continue treatment with MKI and consider topical therapy for symptomatic relief and consider a decrease in dose for a minimum of 7 days and upto 28 days.
<b><u>Grade 3</u></b>	Ulcerative dermatitis or skin changes with pain interfering with function Interrupt the drug until toxicity resolves to grade 0-1	When resuming treatment, decrease dose by one dose level: Sorafenib 400mg daily or 400mg alternate  Sunitinib 25mg daily or 37.5mg alternate days

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**AXITINIB**

**Q. What is Axitinib?**

**Ans.** Oral Tyrosine kinase inhibitor VEGFR 1, 2, 3 specialized inhibitor of VEGFR only.

**Q. What is the dose of Axitinib?**

**Ans.** 5 mg BD

**Q. Why all TKI inhibitors cause HTN & fatigue?**

**Ans.** VEGFR causes ↑ peripheral resistance which causes ↑ HTN.

↓ Blood Supply to limbs → fatigue

↓ Blood Supply to Gut → nausea, diarrhea.



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**PAZOPANIB**

**Q. What is Pazopanib?**

**Ans.** Oral Tyrosine kinase Triple Inhibitor  
VEGFR  
PDGFR } all three Blocked  
FGFR

**Q. What is the Benefit of Pazopanib?**

**Ans.** PFS 11 month (= sunitinib)

no effect of altered renal functions  
F.D.A. approved

**Q. What is the status of Pazopanib?**

**Ans.**

- 1<sup>st</sup> line Mx in low / intermediate risk pts.
- Pazopanib has been side effects than sunitinib.
- Hypothyroidism is not an issue with Pazopanib
- FDA approved
- Rs. 45,000/- per month
- 

**Q. What is the dose/cost of Pazopanib?**

**Ans.**

- 800 mg/OD oral
- votrient 800 mg , single Tablet = Rs. 2,000/-



400mg : Capsule-shaped, white,  
film-coated tablet with the letters  
GS UHL printed on one side

**Q. What is status of Neo adj. Sunitinib?**

**Ans.**

For a highly selected- good risk, patients  
at present there are no clear cut guidelines.  
Biopsy should be taken before; to prove that the tumour in hand is clear cell RCC  
Trials /studies show decrease in tumour size and decrease in thrombus level to various extent,  
**but overall survival rates have not improved.**

**Q. What is the dis adv. of Neo Adj. Sunitinib before Cytoreductive Mx (CM)?**

**Ans.**

- Theoretically- Anti-angiogenic properties may delay wound healing.
- Practically- Studies do not show any effect on wound healing.

**Q. What will you do for patient who progresses in Sunitinib?**

**Ans.**

Everolimus (AUA 2013 guideline level A recommended)

**Q. What is the present gold std. 2<sup>nd</sup> line of drug after sunitinib failure?**

**Ans.**

Axitinib equal to Everolimus fl/by Sorafenib.

## ***Bevacizumab***

**(Q) What is Bevacizumab?**

**(A)** Bevacizumab is humanized monoclonal Antibody against VEGF.

**(Q) What is the dose of Bevacizumab?**

**(A)** 10 mg / kg I.V. administered every 2 weeks.

**(Q) When can you start Bevacizumab after cytoreductive nephrectomy?**

**(A)** After 28 days (wound healing should be complete)

**(Q) What is the status of Bevacizumab?**

- (A)**
- 2<sup>nd</sup> line of Rx after failure of sunitinib / Sorafenib
  - 1<sup>st</sup> line Rx option for low disease burden Pt.
  - Bevacizumab is given in Combination with IFN- $\alpha$
  -

**Q. What is the survival Benefit of Bevacizumab?**

**Ans.** 5 months (in combination with IFN- $\alpha$ )



## ***m-TOR inhibitors***

**(Q) What is Temsirolimus?**

**(A)** mTOR inhibitor (mammalian Target of Rapamycin)  
Binds to mTOR protein & inhibits it thus decreases HIF & subsequent factors.

**(Q) What is the dose of Temsirolimus?**

**(A)** 25 mg/1 ml IV. Once weekly.



**(Q) What will you see for before giving Temsirolimus?**

**(A)** do not give if :-

- Platelet < 75,000
- WBC < 1000
- Hepatic Dysfunction

**(Q) What is the Benefit of Temsirolimus?**

**(A)**

- Progress free survival = 15month (more than Sunitinib)
- Overall Survival = 10 month

**(Q) What is the status of Temsirolimus?**

**(A)** 1<sup>st</sup> line for high risk group patients. (Moetzer criteria score 2 and above)

**(Q) What is the Everolimus?**

**(A)** Oral mTOR inhibitor.

**(Q) What is the dose of Everolimus?**

**(A)** 10 mg / OD / oral =Rs. 40,000/- Per month.

Everolimus should be given with Sucralfate & Pantocid & Zytel gel.

**(Q) What is the Benefit?**

**(A)**

- PFS = 4 months
- O.S = 6 mo.



**(Q) How are mTOR inhibitors metabolized?**

**(A)** Cyp-450 liver metabolism

**(Q) What are the side effects of mTOR inhibitors?**

**(A)** Rashes, Mucositis  
Hepatic dysfunction  
Hyper-cholestrolemia, Hyperglycemia  
Stomatitis / Gastritis = M/c side effect of Everolimus

**(Q) What is the status of Temsirolimus?**

**(A)** 1. Drug of choice for High Risk (MSKCC) patients.  
2. Drug of Choice for Non-Clear Cell RCC  
3. Dose in 25 mg/ml/IV @ weekly

**(Q) What is the present gold std. 2<sup>nd</sup> line of drug.**

**(A)** Axitinib equal to Everolimus fl/by Sorafenib.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) What are the Famous PFS (progress free survival) for targeted Rx?**

**(A)**

Target therapy	PFS	Dose	Side effects
Sunitinib	11 month	50 mg/OD/oral 4 wks on & 2 wks off	Hand feet syndrome
Sorafenib	5.5 month	400mg/ORD/Oral daily	HTN, fatigue
Pazopanib	11 month	800 mg/OD/Oral daily	BMD Hypothyroidism
Temsirolimus	15 months	(25 mg/ml/IV@ wkly)	hepatic dysfunction, hyper- cholestrolemia, Hyperglycemia
Everolimus	4 months	(10 mg/OD/Oral)	Stomatitis / Gastritis

**(Q) What are the drug choices for Non-clear cell-RCC?**

**(A)** Temsirolimus 1<sup>st</sup> Choice

Sunitinib 2<sup>nd</sup> Choice

Erlotinib

Foretinib

Gefitinib

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***LET'S REVISE***

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MSKCC/Moetzer Criteria – Lack – Nx

Survival according to MSKCC criteria.

SWOG – Cyto reductive Mx → SWOG Trial – Benefit 11 months.

ECOG Performance Score

Karnofsky performance Score

Favorable factors for metastatectomy.

IFN-  $\alpha$  → SWOG Trial

Dose  $5 \times 10^6$  Du /  $m^2$  / S.c. x 3 times a wk for 12 wk

survival adv. 4 months

side effects flu like / M / V / B / myalgia

complete Resp. 2%

Status – with Bevacizumab.

Interleukins: 7,20,000/ln/Kg/I.V. x 8 hrs x 15 doses in 5 days

gap of 10 ds – repeat cycle x 8 cycles.

vascular leak syndrome

give Lasix, PFTs

complete Response 9%

Sunitinib TKI – 2006 MEJM → Moetzer et.al. Roger Moetzer

- Sunitinib V/s IFN- $\alpha$
- P.FS 11 month OS – 5 month
- 47,000/- per month
- 50 mg / OD/ P.O. 4 weeks on 2 weeks off

Campbell / Movick Trial → Sunitinib as Neo adj. Rx

- 10% Tumour Shrinkage
- 10% Thrombus red<sup>n</sup>
- status → doubtful

System:Side effects of sunitinib

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Bevacizumab
  - 10 mg / kg IV every 2 weeks
  - Survival Benefit 5 months
- Sorafenib
  - 400 mg / BD (2 x 200 mg) x BD
  - PFS/OS → half of sunitinib
- COMPARZ
  - Trial – Sunitinib V/s Pazopanib
- Pazopanib
  - 800 mg / OD- 45,000/- per month
  - Triple inhibitor
  - PFS = 11 month
  - O.S. 5 months
  - Side effect less                      COMPARZ Trial
- Axitinib
  - VEGFR – Mono inhibitor
  - 10 mg /OD
  - 2<sup>nd</sup> line drug after Sunitinib, Pazopanib, Everolimus

### Side Effects of TKI

- Myalgia / fatigue → give multi vitamins
- HTN → ACE inhibitor
- Hypothyroidism → check TFT
- Mucositis, Rash → Zyte gel
- hand food Syndrome → Hafoos cream KMNO<sub>4</sub>

### Switch Trial → sequential TKI / mTOR

- Temsirolimus
  - 25 mg / IV/ weekly
  - BMD / hepatic dysfn / pulm comp.
- Everolimus
  - 5 mg / BD/ oral = 10 mg / OD oral

### Drugs for Non clear cell RCC

## **GUIDELINE STATEMENTS**

**(Q) What is the best level of evidence & Grade of Recommendation?**

(A) Level-1,  
Grade A → Best Recommendation

**(Q) What are the most imp. risk factors for RCC.?**

(A) Smoking, obesity, HTN

**(Q) When can you order urine cytology in RCC?**

(A) When the enhancing mass is abutting the, or invading the collecting system.  
Ruling out an Upper tract TCC as D/d

**(Q) When will you do DTPA in a case of RCC?**

(A) - raised serum Creat (CKD)  
- Bilateral tumour  
- Familial / Genetic disease (VHL)

**(Q) What Benign masses CT/MRI cannot reliably distinguish from RCC?**

(A) Oncocytomas  
Fat free AML.

**(Q) What is the status of PET scan the RCC Ix?**

(A) NO role for Primary disease evaluation.

**(Q) What is the status of C.T. Chest?**

(A) - CECT chest is the most accurate test to look for pulmonary mets.  
- CECT chest is recommended. Atleast X-ray chest is must.  
- CECT chest should definitely be done for primary tumour beyond T<sub>2A</sub>  
- patients with pulmonary symptoms and those with doubtful CXR should be subjected to CECT chest.

**(Q) When will you order CECT Chest.?**

(A) - mass size T<sub>2A</sub> & above (> 10 cm)  
- T<sub>3</sub> (IVC involvement) (Peri-hilar fat involvement)  
- Nodal disease  
- Doubtful chest CXR-PA  
- Pulmonary Symptoms

**(Q) What is the status of Renal Biopsy for RCC?**

(A) Generally, no need.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) When will you do FNAC of RCC Mass?**

- (A) Only (4) indications for Biopsy
- (1) Radiologically indeterminate mass
  - (2) Small renal masses for surveillance approaches
  - (3) To obtain histology before HIFU/Cryo/RFA
  - (4) In metastatic stage disease to select the targeted therapy.

**(Q) What needle size and type is used for Renal Biopsy**

- (A) 14 or 18 Gauge; Co-axial type: => prostate Gun Biopsy.

**(Q) How many cores will you take?**

- (A) atleast 2 cores of > 10mm size; from periphery of the mass.

**(Q) What are the complications of Renal Biopsy?**

- (A)
- Spontaneously resolving subcapsular hematoma
  - Hematuria
  - Adjacent organ injury,
  - Pneumothorax

**(Q) What is the sensitivity & specificity of Renal Biopsy?**

- (A)
- |               |             |          |
|---------------|-------------|----------|
| Renal, Biopsy | Sensitivity | 80 – 90% |
|               | Specificity | 95-100%  |

**(Q) What % of Biopsies are non-diagnostic?**

- (A) 20-25%

**(Q) What is the risk of tumour seeding the Biopsy?**

- (A) Less than 0.01% (only seven cases reported in Literature)

**(Q) Why is Biopsy not done routinely?**

- (A)
- radiological investigations like CT Scans & MRI are very accurate
  - 20-25% of biopsies are non diagnostic
  - Cannot reliably differentiate RCC from Adenoma or Oncocytoma
  - Needs admission & 24 hr Bed Rest.
  - Needs investigations like coagulation profile, USG guided, CT Guided.
  - Complications like hematoma ,bleeding ,hematuria
  - Does not change the management plan.

**(Q) What are non focal & focal Renal Biopsies?**

- (A) Non Focal: Can be taken from any area of cortex (usually done for nephropathies)  
Focal:- from specific area of mass.( usually done for renal masses)

**(Q) What are the pre procedural workups Required?**

- (A)
- Check Medical history
  - Medication
  - Coagulation Profile

## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) Which is Better Core Biopsy / FNAC /or both?**

(A) Both > Core Biopsy > FNAC

**(Q) Which size needle is preferred?**

(A) 14 gauge

**(Q) What is the no of passes required?**

(A) Two

**(Q) How do you identify the lesion during renal Biopsy?**

(A) Under USG guidance / or CT guidance

**(Q) What is the patient position for Renal Biopsy?**

(A) Prone with Breath holding (↓ L/A) or ipsilateral side down without Breath holding.  
-Supine for Transplant Kidney


**(Q) Do you give anaesthesia for Renal Biopsy?**

(A) Yes; conscious sedation is preferred (midazolam & fentanyl)

**(Q) For how long you help patient in recovery**

(A) 4-5 Hrs.

**(Q) What is the guideline status of Renal Biopsy?**

(A) Must before  ablative therapy HIFU/Cryo/RFA  
Active Surveillance  
Initiating target therapy for metastatic disease or unresectable tumour  
Not needed → in usual cases.

**(Q) Describe the Renal Biopsy procedure?**

(A) NBM 8 Hrs.  
Secure I.V.line & Fluid  
Consent  
Patient placed prone, painting & drapping done  
Midazolam given  
O<sub>2</sub> nasal prongs  
USG machine, Biopsy is taken, 2 Samples  
Compression dressing  
Monitor in Recovery for 4-5 hrs  
Bed Rest  
Once urine is Passed / no hematuria - discharge

**(Q) What are the prognosticating models in RCC?**

(A) Pre op prognosticating model → SSIGN → Mayo clinic's SSIGN Score

- Stage
- Size
- Grade
- Necrosis

## **Neeraj Sharma's ...Notes For Urology Practicals**

Post Op prognosticating models – Kattan

Metastatic prognosticating models → Moetzer's MSKCC

**(Q) What is the status of Renal angioembolization for RCC?**

(A) for Routine cases – No need.

**(Q) What are the Indications for Renal Tumour emboliz<sup>n</sup>?**

(A)

- Non resectable mass
- patient unfit for Sx.- To control gross hematuria
- Prior to resection of mets in Bone / Spine.
- Only in patients unfit for Sx → Emboliz should be done.
- With the Advent of Hand Held Harmonic → no need of Angio emboliz<sup>n</sup> for Collateral vessels.

**(Q) When can you operate after embolization?**

(A) After 72 hrs upto 96 hrs (on 3<sup>rd</sup> -4<sup>th</sup> POD)

Because - oedema around tumour helps in dissection of tumour.

**(Q) What if you operate after 4<sup>th</sup> day of embolization?**

(A) Inflammation sets in; so difficult to do resection

**(Q) What are the disadvantages of Tumour angio embolization?**

(A)

1. Pain, fever
2. Tumour Lysis Syndrome
3. Emboliz<sup>n</sup> of complete Kidney.

**(Q) What is tumour lysis syndrome (T.L.S.)?**

(A) Tumour lysis syndrome is a group of metabolic disorders / Compl<sup>n</sup> caused due to breakdown products of dying cancer cells characterized by

- HyperKalemia ( $K^+ > 7 \text{ m mol / L}$ )
- Hyper Phosphatemia
- Hyperuricemia
- Hypocalcaemia

**(Q) What are the symptoms of T.L.S.?**

(A) Cardiac cond<sup>n</sup> abnormalities ( due to  $\downarrow \text{Ca}^+$ )

Muscle weakness (due to  $\uparrow \text{K}^+$ )

Resp. Failure (due to  $\uparrow \text{K}^+$ )

Tetany. (due to  $\downarrow \text{Ca}^+$ )

Lactic Acidosis

**(Q) What is the classif<sup>n</sup> system for TLS?**

(A) Cairo-Bishop Classif<sup>n</sup> system.

**(Q) What is the M<sub>x</sub> of TLS.?**

(A) Fluids, loop-diuretics, hemodialysis.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) What is the status of Lymphadenectomy during Rad. Mx?**

**(A)** No gain (Blute's Criteria.)

**(Q) What is the use of Cytokinin therapy post Radical Nx?**

**(A)** No use in localized disease.

**(Q) What is the status of Radiotherapy?**

**(A)** No use – can be used for palliative purposes for Bone pain & brain mets.

**(Q) What is the study behind sequencing Targeted therapy?**

**(A)** Switch, Axis Study

Sequencing targeted therapy means to give sunitinib first → disease progressive → give Pazopanib → disease progresses → give Everolimus/ Temsirolimus.

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### **LET'S REVISE GUIDELINE STATEMENTS**

- Role of urine cytology in RCC
- Benign enhancing masses
- Ind<sup>n</sup> for CT chest
- Ind<sup>n</sup> for Biopsy in Renal mass
- Complication of Biopsy
- Risk of Tumour Seedling
- Renal Biopsy procedure
- Ind<sup>n</sup> for Renal Tumour angio emboliz<sup>n</sup>
- Timing of op<sup>n</sup> after emboliz<sup>n</sup>
- Tumour lysis syndrome
- Symptoms & Mx of Tumour lysis Syndrome
- Causes of right Varicocele
- Causes of Pain in C/L Kidney
- Margin + ve after partial Nx



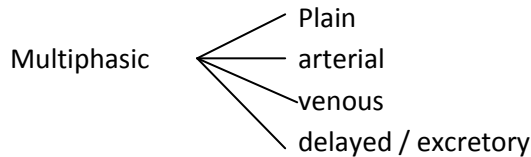
**INVESTIGATIONS IN RCC**

**(Q) Upto what level of creatinine can you do contrast studies?**

(A) 1.8 – CECT  
2.7 – MRI with gadolinium.

**(Q) Which CT scan will you order?**

(A) CECT Abdomen multiphasic with C.T. urography & C.T. angio



I will pre orders the Hounsfield Unit measurement in CECT request.

**(Q) How can you say in mass is RCC?**

(A) If the mass enhances by more than 15 H.U.

**(Q) What all masses will enhance on CECT?**

(A)	Malignant	(A)	Benign
(1)	RCC	(1)	AML
(2)	TCC	(O)	Oncocytoma <sup>6</sup> Leimyoma
(3)	Lymphoma	(A)	Adenoma
(4)	Sarcoma	(M)	Metanephric adenoma
		(C)	Cystic nephroma

**(Q) How will you differentiate RCC from TCC on CT scan?**

- (A)
- RCC is Brightly enhancing on CECT
  - RCC is more peripheral / exophytic In kidney location v/s TCC is central.
  - RCC distorts the PC system but does not infiltrate it
  - RCC never fills up the PC system V/S TCC fills the PC System.
  - RCC – Central Calcification, TCC – Peripheral calcification.
  - On clinical presentation RCC may present as abdominal lump v/s hematuria by TCC.

**(Q) How will you differentiate RCC from Lymphoma?**

- (A) Lymphoma →
- Bilateral
  - infiltrative masses
  - not well enhancing
  - clinically other nodes
  - 'B' symptoms

## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) How will you differentiate RCC from secondary mets?**

- (A) Secondaries are –
- Bilateral tumours
    - multiple
    - small
    - A/W primary malignancy features
    - Secondaries are isodense on plain C.T.
    - Enhance (But poorly) on CECT (5-30 H.U.)

**(Q) What are the common primaries that can send secondaries to kidney?**

- (A) Hematogenous spread to kidney from lung, Breast, Gastro, melanoma, Hematological malignancies.

**(Q) How will you differentiate renal lymphoma from RCC?**

- (A) Non Hodgkin's Lymphoma  
Hodgkin's Lymphoma  
Hematogenous spread to kidney
- } Both can involve kidney

Renal lymphoma - B/L (may be U/L)  
Multiple 50% (may be single)  
multiple small masses  
Hypo vascular pattern on angiography  
Enhancing variably  
Cannot be differentiated from RCC

**(Q) What will you suspect renal lymphoma in pt. with enhancing renal mass?**

- (A) Pt. with multiple small enhancing masses  
pt. with poorly enhancing multiple masses  
H/O. lymphoma  
a/w multiple L.N, Retroperitoneal lymphadenopathy, splenomegaly.

**(Q) How will you differentiate RCC from Renal Sarcoma?**

- (A) - Renal Sarcoma is rare (1 in 210)  
Sarcoma is usually - exceptionally large  
- Palpable mass  
- Symptomatic  
On C.T. – growth appears to originate from renal capsule  
Absence of L.N.  
Cannot be reliably differentiated from RCC.

**(Q) What is Oncocytoma?**

- (A) Oncocytoma is a Benign, not fat containing renal mass.

**(Q) How can you differentiate Oncocytoma from RCC on C.T. Scan?**

- (A) Central stellate scar on reconstructed images.  
Spoke wheel pattern on angiography

## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) Can we tell on C.T. whether it is Oncocytoma or RCC?**

(A) No - Oncocytoma may be suspected only it cannot be reliably differentiated from RCC

**(Q) Can we diagnose Oncocytoma By FNAC?**

(A)

- Oncocytes will be seen on FNAC Specimen
- But it cannot be guaranteed that whole tumour contains Benign oncocytes only.
- high chances are there that there may atypical / malignant cells in rest of the tumour
- So Biopsy is of no role; tumour has to be excised
- cannot be differentiated from Chromophobe RCC / Eosinophilic RCC.

**(Q) What % of small mass are benign?**

(A) 20% of small "Enhancing Masses" are benign and usually Oncocytoma.

**(Q) Why you need to see plain sections of CECT, when you are looking for enhancing for RCC?**

(A) To see "Fat" in mass; rule out AML

To compare for H.U. plane V/s enhanced mass

**(Q) How will differentiate RCC from AML**

(A) AML will contain FAT on C.T. Plain

AML as attenuation of (-20 HU)

**(Q) When can we not sure of AML V/S RCC?**

(A) Low fat AML

Liposarcoma

**(Q) What are the fat containing Renal tumours?**

(A) Lipoma

Angiomyolipoma - (Benign)

Liposarcoma (malignant)

**(Q) What are the complex cystic Tumours / masses on C.T. Scan?**

<b>(A) Malignant</b>	<b>Benign</b>	<b>Cyst./Abscess</b>
Cystic RCC	Cystic Nephroma	infected Cyst
Cystic Wilms		Renal Abscess
		Hemorrhagic cyst.

**(Q) What are cystic masses will enhance?**

(A)

- Cystic RCC
- Cystic Wilms -
- Cystic nephroma
- For Infected cyst only Borders will enhance.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**(Q) What is the USG appearance of RCC?**

- (A) Typically RCC on USG will depict a
- a iso-echoic lesion
  - Prominent Buldge in renal outline
  - Central necrosis if large tumour
  - Doppler shows increased vascularity with peripheral rim of avascularity
  - Heterogenous if necrosis calcification, clots etc.
  - Cystic variants appear cystic swellings.

**(Q) Describe the Bosniak Classification of cysts?**

(A) Bosniak classification is a comprehensive classification of renal cystic masses on contrast enhanced CECT based on five features namely cyst wall thickness, cystic fluid, septations, calcifications and enhancement after contrast administration.

It is a radiological classification evolved by M.A. BOSNIAK (radiologist)

This radiological classification helps in predicting the risk of malignancy in such mass and suggests the treatment thereof in the form of surveillance or excision.

Bosniak Class	Wall	Fluid	Septae	Calcif <sup>n</sup>	Enhancement	Risk of Malignancy
I	hairline thin	clean	Nil	Nil	Nil	0%
II	hairline (size <3cm)	clear	hairline	fine specks of Calcif <sup>n</sup>	Nil	0-3%
II-F	thin wall (size > 3 cm)	Clear	Multiple hairline	thick modular	Nil	3-5%
III	thick wall	turbid	thick	Thick	present	50%
IV	thick	Soft tissue components	thick irregular	Coarse	present	70-90%

**(Q) What does 'F' stands for in stage II –F?**

(A) 'F' stands for follow-up

**(Q) What kind of Bosniak cysts will require surgical excision?**

- (A)
- |      |      |   |                              |
|------|------|---|------------------------------|
| Type | I    | - | not even surveillance needed |
|      | II   | - | not even surveillance needed |
|      | II-F | - | Periodic surveillance must   |
|      | III  | - | Surgical Excision needed     |
|      | IV   | - | Surgical Excision must       |



**Neeraj Sharma's-**  
**NOTES FOR UROLOGY PRACTICALS**

**Ca bladder**

## **Neeraj Sharma's ...Notes For Urology Practicals**

60 yr/male pt is admitted with complaints of hematuria since 3 days

**ODP:** The patient was relatively asymptomatic before 3 ds when he noticed blood in the urine/ red colored urine

- Blood was throughout the stream
- Urine had amorphous clots
- There was no associated pain (with the void or otherwise) or fever.
- He voids around 200-300 ml per void.

He had similar episodes twice in the past (2 months back) for which he was taken local treatment and the episodes subsided within a day or two that time also there was no fever / pain.

H/o passing urine 6-7 times /day

@ 3-4 times / night

Not associated with (a/w) urgency / urge incontinence

No H/o decrease in urine flow / intermittency/ interruption of stream / sense of incomplete voiding /strain to void

No H/o instrumentation

No H/o / wt loss

No H/o any drug / medications/

No H/o generalized bleeding tendency / bleeding from any other site

**Past medical H/o:** No H/o DM/HTN/TB

**Sx h/o** : Nil

**Family H/o** : nothing +ve in family H/o

**Personal H/o** :                smoking since last 35 years and has quit smoking since last 9 years.  
                                        Drinking – Neg  
                                        Occupation – farmer

**Gen Exam:** the patient is well oriented to time place & person

- Moderately built, moderately nourished

T- Normal	pallor +ve
P -80/ min	no clubbing
BP- 110/70 mmHg	no cyanosis
RS/CVS =clear	no Icterus
	B/L lower limb edema + up to ankles
	No generalized LN

**P/A** – inspection / palpation / auscult<sup>n</sup> – normal

**Local exam** – penis is normal , uncircumcised

- Meatus normal, no stenosis, placed at tip
- Scrotal skin normal
- B/L testis ; no varicocele

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Hernia sites normal

### **DRE:**

- Anal tone normal
- Rectal mucosa free, mobile
- Prostate 2 finger breadth enlarged
- Median sulcus palpable
- Consistency is soft, non Tender.

### **Q: what are the causes of hard prostate?**

A:

- chr. Prostatitis
- Ca prostate
- Post BCG
- post TURP
- Granulomatous prostate (TB),
- Prostatic infarct / stone.

### **Q: what is Guaiac Test?**

A: DRE → Stools on Glove → send for occult blood → Guaiac strip → Guaiac test.

### **Q: what is hematuria?**

A: Presence of blood in urine is hematuria

### **Q: what is microscopic hematuria?**

A: more than 3 RBCs / HPF (40x magnification power) of the centrifuged urine sample

### **Q: what is gross hematuria?**

A: hematuria visible to naked eye.

### **Q: what are the things you want to know from the patient who complaints of hematuria?**

A:

- Timings of hematuria
- association with pain
- Presence of clots, shape of clots.

### **Personal H/O**

- Smoking
- Previous attacks
- previous Investigations
- anti coagulant drugs
- Lithuria, dysuria & LUTs, wt loss.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the relevance of timing of hematuria w.r.t urine stream?**

A:

Initial hematuria

- very rare
- due to urethral pathology
- due to inflammation

Total hematuria

- most common
- due to bladder/ upper tract pathology
- infection / tumour / stone / UTI

Terminal hematuria → at the end of micturition

- Secondary to inflammation in the area of bladder neck or trigone / prostatic urethra.

**Q: what is importance of a/w pain?**

A: painless hematuria → malignancy

Painful hematuria → Clot colic → due to upper tract clots.

**Q: what is the imp of shape of clots?**

A: slender clots or thread like clots are from upper tract

Amorphous clots are usually from bladder

**Q: what are the causes of Red urine?**

A:

- Hematuria
- Hemoglobinuria
- Myoglobinuria
- Dietary – black berries, Beetroots (anthracyanins)
- Drugs – Rifampicin, Phenothiazines.

**Q: what will be the first test for Hematuria?**

A: urine dip stick test.

**Q: what is the principle of urine dip stick for hematuria?**

A: urine dip stick has a peroxidase reagent substrate (ortho-toluidine) on which hemoglobin acts like peroxidase like activity and thus changing the colour of the substrate.

**Q: For how long you have to dip the stick in urine?**

A: 3-5 seconds

**Q: when will you see for results?**

A: after 1 min (60 sec)

## Neeraj Sharma's ...Notes For Urology Practicals

**Q: what are the chief components which are usually tested on urine dip stick examination?**

A:

- blood
- sugar
- protein
- nitrites

**Q: what is the general colour marker for blood?**

A: yellow → light green → green → dark green

(neg)

strongly (+ve)

Specific Gravity Densidad Densidade 60 sec/seg.							
	1.000	1.005	1.010	1.015	1.020	1.025	1.030
pH 60 sec/seg.							
	5.0	6.0	6.5	7.0	8.0	9.0	
Leukocytes Leucocitos 60–120 sec/seg.							
	neg.	ca. 15	ca. 75	ca. 125	ca. 500	Leuko/μL	
Blood/Hemoglobin/ (re)(ue)/Hemoglobina 60 sec/seg.							
	neg.	ca. 5-10	ca. 10	ca. 25	ca. 25	ca. 50	ca. 50
Nitrite/Nitrito/Nitritos 60 sec/seg.							
	neg.	+	++				
Ketones/ C.Cetónicos 60 sec/seg.							
	neg.	5 (0.5)	15 (1.5)	50 (5)	150 (15)	mg/dL (mmol/L)	
Bilirubin/Bilirrubina/ 60 sec/seg.							
	neg.	+	++	+++			
Urobilinogen(o)/ Urobilinogênio 60 sec/seg.							
	normal	1 (17)	4 (70)	8 (140)	12 (200)	mg/dL (μmol/L)	
Protein/Proteínas/ Proteínas 60 sec/seg.							
	neg.	15 (0.15)	30 (0.3)	100 (1)	300 (3)	1000 (10)	mg/dL (g/L)
Glucose/Glucosa/ Glucose 60 sec/seg.							
	normal	100 (5.5)	300 (17)	1000 (55)			mg/dL (mmol/L)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what other information will this dipstick gives?**

A: see for

1. protein (to rule out glomerular causes)
2. nitrites (to rule out UTI)
3. glucose (general DM)
4. Leucocytes (pus cell / UTI)
5. Specific gravity

**Q: what is the general colour of protein change?**

A: shades of green.

**Q: what is the D/D interpretation of +ve dipstick for blood?**

A: D/D:

1. Hemoglobin urea
2. Myoglobin urea
3. Hematuria

**Q: what are the sensitivity / specificity of urine dip stick?**

A: sensitivity > 90%

Specificity = 70%.

**Q: what are the causes for false –ve dipstick for hematuria?**

A: over diluted urine

Ascorbic acid → inhibits peroxidase activity

**Q: what is 'the' diagnostic test for ruling in/out hematuria?**

A: Urine – Routine microscopy

See for RBCs under microscopic.

Also shape of RBCs will give a clue about pathology.

**Q: what are the causes of false +ve dipstick?**

A:

- Urine sample mixed with menstrual blood
- Dehydrated patient
- Post exercise sample.

**Q: suppose Urine routine does not show RBCs (in pt of urine dipstick +ve for hematuria) what will you do?**

A: Possibilities are

- Myoglobin urea
- Hemoglobin urea
- Over diluted urine (check specific gravity)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: how will you differentiate b/w Myoglobinuria v/s Hemoglobinuria?**

A:

- centrifuge the specimen and see the supernatant part
- Supernatant pink → hemoglobinuria → because Hb binds to haptoglobin
- Supernatant clear → Myoglobinuria → because Myoglobin is water soluble
- Myoglobin → mixes well → clear supernatant
- Hb → Heterogenous soln → hazy pink supernatant

**Q: How can you guess the cause of bleeding on the basis of urine routine microscopy?**

A: look for

- Shape of RBC
- RBC – casts
- Proteinuria

	Shape of RBC	RBC cast	Proteinuria
Glomerular hematuria	dysmorphic	++	++
Tubulo--intestinal hematuria	normal	--	++
Urinary tract bleed	normal	-	-

**Q: why are RBCs from upper tract dysmorphic?**

A:

- due to being acted upon by renal macrophages
- Squeezing through glomerular capillaries.

**Q: how will you identify the RBC in Urine routine?**

R: RBCs are circular, non nucleated

**Q: What will you interpret with Urine routine examination depicting dysmorphic RBCs, with casts with proteinuria?**

A: Glomerular hematuria.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the common causes of glomerular hematuria?**

A:

Cause	symptoms
1. Ig A nephropathy (Berger's disease)	- young pts/ adults ( memory aid-young people eat burger) - responds to steroid -non responders → methotrexate / CRF pt
2. Alport's disease	- familial nephritis+ deafness -anti GBM antibodies.
3. SLE	-RAS, arthritis, -auto immune disease association -female
4. good pasture syndrome	-Generalized bleeding tendency + hemoptysis
5. post streptococcal G.N	-H/O recent URTI

**Q: what are the causes of non –glomerular hematuria?**

A:

- Tubulo – intestinal
- R.V thrombosis
- Reno vascular
- Anticoagulants / Exercise induced.

**Q: what are the characteristics of non glomerular hematuria?**

A:

Dysmorphic RBCs → No

RBC cast → no

Protein urea → yes ++

**Q: what is the hall mark of urinary Tract bleeding?**

A: Fresh circular RBCs,

No cast, no protein urea.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: if Urine routine examination is showing proteinuria; what is the next I<sub>x</sub>?**

A: 24 hr urinary protein

- 0- 1 gm / 24 hr – normal
- 1-3 gm / 24hr → tubule – intestinal (chiefly low molecular wt proteins & not albumin)
- >3 gm / 24 → glomerular cause (chiefly albumin)

**Q: how do you confirm proteins in urine?**

A: Add sulfo-salicylic acid & Proteins will precipitate

**Q: what will you know type of proteins in 24 hr urinary proteins?**

A: By protein electrophoresis

>= 70% albumin → glomerular disease

Tubulo intestinal disease → > 70% IgG & immunoglobulins and only 10-20% albumin

**Q: what is the peculiarity of Bence – Jones protein ?**

A: dip stick is negative for urine proteins but sulfasalicydic acid test is +ve

- Characterizes multiple myeloma.
- Light chain proteins.

**Q: what guidelines are there for evaluation of hematuria?**

A: AUA best practice guidelines 2001.

**Q: What are the components of Hematuria work up?**

A:

- Urine dip stick(mandatory)
- Urine-routine, CBC , RFTs, coagulation profile(mandatory)
- Urine cytology
- USG (mandatory)
- CECT KUB
- Cystoscopy

**Q: what is the guidelines statement regarding cystoscopy**

A: for age < 40yr

Pt – asymptomatic

Hematuria – microscopic

CT imaging – Negative



cystoscopy may be deferred.

For everyone else; do flexi cystoscopy / cystoscopy.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the major urological causes of hematuria?**

A:

- Urothelial malignancy
- Ca-Prostate
- Ca-Rcc
- UTI
- Stone disease
- GUTB
- Nephrological /medical causes

**Q: how will you D/Dx whitish urine?**

A;

- Pyuria → on dip stick
  - pH-alkaline
  - leucocytes +ve
  - nitrite +veOn urine routine -pus cells seen
- Phosphaturia → clears on adding acetic acid
- Chyluria → urine having chyle- Triglycerides / lipids.

**Q: a 50 year male presents with gross painless hematuria ,What special will you ask in history?**

A:

- H/o smoking
- Occupation – Rubber, chemical, dye, Tar, painting worker
- Travel- Egypt-schistosomias
- Drug H/o → Cyclophosphamide, warfarin, anticoagulants, SLE.

**Q: what are the common causes of frank hematuria in 50-60 yr /m?**

A:

- Bladder TCC 28-30%
- UTI 10%
- Renal calculi 7%
- RCC 5%
- TCC upper tract 5%
- Ca- Prostate 5%

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What are in general causes of hematuria?**

A:

- Cancer: TCC bladder, RCC, prostate, TCC – upper tract
- Stone : bladder, ureteric, renal
- Infn: TB, Schistosomias, UTI
- Inflm : Cyclophosphamide
- Trauma : Blunt / penetrating
- Cystic : renal cysts, ADPKD
- Vascular : AV fistula, R.V thrombosis
- Nephrological : IgA, Alport's, post – streptococcus, good pasture disease
- Medical: Coagulation disorders, warfarin, sickle cell disease.

**Q: What is the relation of blood & urinary stream?**

A;

- Blood in the end urinary stream: prostatic urethra, bladder neck
- Blood In the start of the stream: urethral /meatus
- Blood throughout the stream: bladder, pathology, upper tract

**Q: what is the relation of clots?**

A: Amorphous clots → Bladder, prost urethra

Serpentine clots → kidney / upper tracts.

**Q; why have you asked for pain?**

A: painful hematuria → infn, inflm, stone, obstn, -cystitis

Painless: Ca-Bladder

Colic – Upper tract TCC/RCC

-clot colic

**Q: what is strangury?**

A; **strangury-** “ Slow and painful discharge of the urine, due to spasm of the urethra and bladder.”

From- Dorland's Medical Dictionary for Health Consumers. © 2007 by Saunders

**Strangury-** “ Slow, painful urination in which the urine is passed drop by drop.”

The American Heritage® Medical Dictionary Copyright © 2007, 2004

- It is the suprapubic pain at the end of micturition
- Slow & painful discharge of urine
- Pain in suprapubic area due to bladder neck spasm-stone /cystitis.



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is dysuria?**

A: Burning sensation / pain, while voiding involving usually whole of the ant. Urethra but max. at the tip. It represents urethral pathology usually.

### **Q: why H/O drug intake is important?**

A: antiplatelet agents – aspirin, - clopidogrel

- Only change the fn for platelet
- Does not effect number of platelets.

Heparin effects intrinsic pathway leading to abnormal APTT

Warfarin effects: Extrinsic pathway leading to PT/INR abnormal.

### **Q: why H/O instrumentation is important?**

A:

- To see findings of previous cystoscopy if any
- Any h/o VIU Stricture etc.,
- Instrumentation can also cause bleeding

### **Q: why amount of void is important?**

A:

- Rough estimate of bladder capacity
- Gives an idea about nature of LUTS

### **Q: why H/O TB is important in case of ca bladder?**

A: may need BCG instillation in future

### **Q: what weight loss is considered as significant weight loss?**

A: 10% weight loss in 6 months

### **Q: how will you assess wt loss?**

A

- Check previous Records
- Subjective – arm/face to lose first  
- gluteal fat goes last.

### **Q: What is the importance of occupational history?**

A: following occupations are more associated with TCC

- Paints
- Dye
- Coal tar
- Petrochemical

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: In how many years the risk of smoker v/s nonsmoker becomes equal after quitting smoking?**

A:

- It never becomes equal to non smoker even after quitting smoking
- but almost after equal number of smoking and non smoking years( min . 20 yrs) risk becomes substantially low ,but still slightly higher than non smokers

**Q: what is a normal day time frequency?**

A: 5-6 /day @ 300ml each

Causes of large amount frequency (polyuria)

- DM
- D.I
- Excessive fluid ingestion
- Diuretics

**Q: what is P.T / INR?**

A:

- P.T is Prothrombin time; normal 10-14 sec .Determines the clotting tendency of blood .P.T. measures factor I,II, V , VII , X
- INR is the ratio of PT (of patient) / PT (or control).Normal INR is 1.0
- PT/INR → measures the extrinsic pathway of coagulation
- Values raised in warfarin dose / or vit k deficiency

	<b><i>PT</i></b>	<b><i>APTT</i></b>	<b><i>Bleed time</i></b>	<b><i>Platelet counts</i></b>
<b><u>Vit K def</u></b>	prolonged P <sub>L</sub>	normal (N)	normal (N)	normal (N)
<b><u>Warfarin</u></b>				
<b><u>Aspirin</u></b>	normal (N)	normal (N)	P <sub>L</sub>	normal (N)
<b><u>Uraemia</u></b>	normal (N)	normal (N)	P <sub>L</sub>	normal (N)
<b><u>Clopilet</u></b>	normal (N)	normal (N)	P <sub>L</sub>	normal (N)

**Q: what is APTT?**

A:

- Activated partial thromboplastin time
- Depicts the function of intrinsic pathway Factor 8 9 10 11 12
- Normal value = 25 sec – 35 sec (lab dependent)
- Prolonged with use of heparin.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is Bleeding time?**

A:

- time to stop bleeding
- Ivy method & duke's method
- Measures the fn of platelets
- Normal value = 9-10 min
- Values affected by aspirin / Clopilet / DIC / thrombocytopenia.

**Q: what is clotting time?**

A:

- Time for blood sample to coagulate
- Capillary tube method
- Measure of  $\text{Ca}^{++}$  and fibrin.

**Q: what is your differential diagnosis for the given patient of hematuria?**

A:

- Ca bladder (painless/ smoothing / age)
- Upper tract malignancy
- Bldr
- Cystitis
- TB
- Stone

**Q: what do you want next?**

A:

- Urine –Routine - RBCs /pus cells → infn  
protein →CKD
- Urine culture → if pus cells+
- CBC
  - Hb → anemia status
  - TLC → infection
- Platelets
- Coagulation profile
- RFTs → Renal fn (will be used for CECT/ chemotherapy/antibiotics)
- LFTs → (will be used for chemo / BCG / anaesthesia)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is D/D of Red urine?**

A:

- Hematuria, Hemoglobinuria, Myoglobinuria
- Anthracinins in BEETS/ Black berries
- Rifampicin
- Chronic lead / mercury poisoning

**Q: how will you differentiate RBCs from tumour cells?**

A: RBCs biconcave flat discs / non nucleated.

**Q: what is decoy prostate?**

A: when you blame the prostate for hematuria but hematuria is not due to prostate.

**Q: If Hb is 9.0 gm%; what causes does it rule out?**

A: calculus                      } does not cause severe anemia  
Infection                      }

**Q: how can BPH cause anemia?**

A:

- Obstructive uropathy/ CRF
- Recurrent hematuria
- Piles

**Q: what other investigation do you need?**

A: urine cytology

**Q: how many samples will you send?**

A: 3 samples one on each consecutive days

**Q why three samples are needed?**

A – multiple samples improve the sensitivity

-1 <sup>st</sup>	40%	} sensitivity
-2 <sup>nd</sup>	50%	
-3 <sup>rd</sup>	60%	

Samples :

- Freshly voided ambulatory sample
- 50 ml container

**Q: how will urinary cells TCC appear?**

A: Hyperchromatic Blue with larger nuclei in small cluster of singles

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what stain is used for urine cytology?**

A:

- Papanikolaou stain – multi dye stain procedure that uses 5 dyes: Hematoxylin, orange, Eosin, Light green SF, Bismarck Brown
- Initially used for Ca Cervix PAP smear.

**Q: can you do cytology in case of hematuria?**

A: some people do it with acetic acid used to lyse the RBCs

**Q: what are the causes of false positive urine cytology?**

- After chemo radiation
- UTI
- Instrumentation
- Indwelling catheter
- Any intravesical therapy

**Q: what are the causes of false negative urine cytology?**

A:

- Hemorrhage
- Low grade TCC

**Q: what is the sensitivity & specificity of urine cytology?**

A:

- General sensitivity is 40 – 50%
- Sensitivity increases with high grade(>80% sensitivity) tumours
- > 90% specificity

**Q: how can you increase the sensitivity of urine cytology?**

A: multiple samples

Barbotage

**Q: what are the markers other than cytology?**

A: test marker      sensitivity      specificity

- |                  |    |    |
|------------------|----|----|
| • cytology       | 50 | 90 |
| • NMP -22        | 70 | 90 |
| • BTA stat       | 60 | 70 |
| • BTA trak       | 60 | 70 |
| • Urovision fish | 80 | 95 |

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is age / sex distribution of TCC bladder?**

A: M:F = 3:1 to 4:1

Age = 70 yrs (rarely < 40 yrs if < 40 yr – well differentiated)

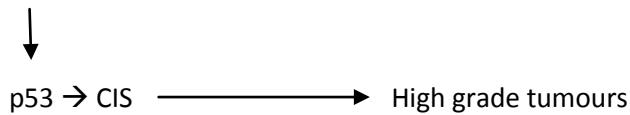
**Q: what are the Etiological factors?**

A:

1. Genetic
2. External
3. Hereditary

**Q: what are the molecular pathways for development of Ca bladder?**

A: normal epithelium → 9p- mutations → PUNLMP low grade NMIBC



**Q: what are the preventions strategies?**

A:

- smoking cessation
- Excess hydration
- Low fat diet
- Multivitamins , zinc
- Green tea extracts
- Celecoxib (cox -2 inhibitor)

**Q: what are the histological subtypes of bladder cancer?**

A: Urothelial

- Micro-papillary variant (micro cystic)
- Small cell variant
- Clear cell variant
- Glandular

Non urothelial

1. Sarcoma
2. Small cell Ca
3. Sq. cell Ca
4. Adeno Ca
5. Signet ring cell

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: how are genetics related to ca bladder?**

A: Genetics : N- acetyl Transferase (NAT) detoxifies nitrosamines ; so slow acetylators have increase risk in comparison to fast acetylators .

### **Q: what are the external risk factors?**

A:

#### External risk factors:

- Aromatic amines,
- Smoking,
- Diet, drinks, drugs
- Infn, inflammation , radiation, chemo.

#### Amines:

4 – Amino bi phenyl  
Arsenic  
Benzidine  
Toluidine  
Naphthalamine

Smoking: 2-6 times risk

Diet: fruit & vegetable are protective

Drinks: Tea / coffee increases risk. More water/ fluid intake less risk

Drugs: acetaminophen (PCM) increase risk

Pioglitazone (antidiabetic)

#### Infn:

- schistosomias hematobium (sq cell ca)
- Bacterial infn (chronic catheter –sec stone)
- HPV – (SCC)

Radiation: XBRT increased risk

Chemotherapy: Cyclophosphamide. Carcinogenic metabolite of Cyclophosphamide is → acrolein

### **Q: what are the hereditary risks?**

A: family h/o ca bladder increases the risk

Associated with RB – gene, P53 gene, acetylating rates.

### **Q: what is the histological classification?**

A:

- Papilloma, Reactive hyperplasia, atypia
- PUNLMP
- Low grade
- High grade

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is NMIBC?**

A: Non muscle invasive bladder cancer.

**Q: what are the genes associated with low grade / high grade tumours.**

A: Low grade tumours → 9p21, FGF – 3

High Grade tumours → P53, RB gene.

**Q: what are the modes of spread?**

A:

- Direct
- LVI
- Pagetoid spread (when cancer cells grow underneath a layer of normal appearing surface urothelium)

**Q: in which Type will you see Pagetoid spread?**

A: CIS

Prostatic urothelium is usually involved on Pagetoid spread

**Q: what is the overall sensitivity / specificity of cytology?**

A: sensitivity-40-60-% (depending upon grade , high grade has high chances)

Specificity- 95-100%

**Q: what are the non – TCC ca?**

- A:
- sarcoma
  - Signet cell Ca
  - Small cell Ca
  - Sq. cell Ca
  - Adenocarcinoma.

**Q: In which pts bladder Adenocarcinoma ca occurs?**

A:

1. Patent urachus , diverticulum
2. Exstrophy
3. Augmented bladder with intestinal segment

**Q: what is the most common histological type of ca bladder?**

A: TCC

**Q: what are rare types?**

A: small cell Ca- ' P-NET'      } both are aggressive  
Micropapillary variant      }



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: with which disease sq. cell carcinoma of the bladder is associated with?**

A: Bilharziasis, stone, chronic catheters, Recurrent UTI.

**Q: what are the histological types of Ca bladder?**

A:

- TCC
- Sq. cell ca
- Adenocarcinomas
- small cell Ca
- sarcomas
- signet cell Ca

**Q: what the Benign Tumours of Bladder?**

A:

- |   |   |
|---|---|
| P | Papilloma                               |
| E | Epithelial metaplasia                   |
| N | Nephrogenic adenoma                     |
| C | Cystitis cystica / cystitis Glandularis |
| I | Inverted Papilloma                      |
| L | Leiomyoma, Leukoplakia                  |

**Q: what are the most common symptoms of ca bladder?**

A: Painless gross hematuria (85 – 90%)

LUTS → Presence of LUTS is suggestive of muscles infiltration disease or CIS

**Q: what will you see in physical examination?**

A: most patients will have nothing specific but see for

- Full bladder due to clots,
- Hydronephrotic kidneys presenting as abdominal lump
- Do DRE carefully for prostate size & consistency.

**Q: what all includes a full hematuria work up?**

A: Full hematuria work up includes

- CBC
- Cytology -Urine
- CT scan abd + pelvis
- Cystoscopy (for age > 40 years)
- Sr. P.S.A total(for age > 40 years)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what % of ca bladder pts will present as gross hematuria?**

A: 85% of ca bladder pts will present as gross hematuria.

**Q: what % of hematuria patients will have bladder cancer?**

A: 15% (25% will have urothelial malignancy, 15% - will have bladder malignancy)

**Q: what all lab investigations are done for Ca Bladder?**

A:

Urine routine analysis, Urine culture (if urine routine is suggestive of infection)

Urine cytology

Hb, TC, DC, ESR, RBS, Urea, Creatinine, electrolytes

Usg – abdomen + pelvis

**Q: what all will you look in USG abd + pelvis?**

A: Bladder – mass, number, size, shape – papillary or sessile

Kidney any mass / any HUN

Liver, spleen – for mets

**Q: can you predict muscle invasion in USG?**

A: Ipsilateral HUN should lead to suspicion of muscle invasion.

**Q: What are the bladder tumour characteristics in USG?**

A:

Hyperechoic or atleast isoechoic with bladder wall.

Pedunculated / sessile mass is seen

Mass does not change position (bladder clot will change position with change in patient position)

**Q: what are the D/Ds for bladder masses in USG?**

A:

- Bladder clot: mobile mass; no enhancement on CECT
- Extrinsic tumour/compression: prostatic middle lobe, rectal mass, vaginal -cervical masses.
- Extrinsic inflammation → diverticulitis
- Bladder inflammation: chronic cystitis
- Trabeculation: vary with variable bladder filling volumes
- Bladder stone.

**Q: what is stipple sign on IVP for bladder?**

A: entrapment of contrast between various frawns of bladder tumour

**Q: what does calcification in bladder tumour depicts about grade of malignancy?**

A: usually Low grade malignancy

---

**URINE CYTOLOGY**

**Q: what sample of urine is used?**

A: ambulatory, freshly voided, mid stream- whole specimen

**Q: what kind of collection bottle is given?**

A: sterile but without preservatives

**Q: within what time sample should be processed?**

A: processing time within 1 hr of collection

**Q: what if sample cannot be delivered in 1 hr?**

A: if delayed equal volume of ethanol can be added but better avoided take fresh samples only.

**Q: can you do urine cytology in Hematuria?**

A:

- Usually due to gross hematuria the RBCs will form a layer of cell sheath so that it becomes very difficult to identify the malignant cells in microscopy.. So exam answer is –NO.
- But practically, any weak acid when mixed to urine can cause lysis of RBCs, so that abnormal malignant cells can then be identified in microscopic examination.
- Ideally one can ask the pathologist whether he is comfortable in doing urine cytology with ongoing hematuria
- Still recommended answer is ...".No" urine cytology during ongoing hematuria, if examiner insists then give a relevant answer as per situation.

**Q: which solution can be used for lysing RBCs as well fixing slides?**

A: use corny's fixative (Chloroform, alcohol, acetic acid in the ratio of 3:2:1.)

**Q: what are the steps in cytology?**

A:

1. Collecting jar can take 100ml sample → fill 2 test-tubes for one pt (one test tube = 15ml)
2. Centrifuge the two test-tubes 2000 rpm for 10 min (2 test tubes for one patient)
3. Take sediment out and Put sediment onto 4 slides
4. Albumin (3 drops) is added to each slide for adhesion of cells to the slide.
5. cytospin – deploy its funnel, filter and absorbents and albumin loaded slide ,
6. centrifuge at 750rpm x 5 mins
7. Cytosine automatically makes slide.
8. Take out the slides (total 4 in number for one pt) and put them in fixative (50% ethanol) for 10 minutes.
9. Dry the slide and take to staining machine.
10. Stain with **Papanikolaou stain** (40 min total)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the components of Papanikolaou stain?**

A:

- Hematoxylin → for nucleus staining
- |  |   |                        |
|--|---|------------------------|
| <ul style="list-style-type: none"><li>• Eosin</li><li>• Orange G</li><li>• Light green SF</li><li>• Bismarck brown</li></ul> | } | for cytoplasm staining |
|--|---|------------------------|

**Q: what are the principles behind urine cytology?**

A: high grade tumours → loss of cohesiveness → more shedding of cells → (Exfoliated cells) more chances of +ve cytology.

**Q: what are the sensitivity & specificity for urine cytology?**

A:

- General Sensitivity = 50%
  - Low grade tumour = 30%
  - High grade tumour = 70%
- NOCK ET AL
- |   |                   |
|---|-------------------|
| } | specificity ≥ 95% |
|---|-------------------|

**Q: how many samples will you send for urine cytology?**

A: Best is- three samples on Days 1, 2 & 3.

**Q: what are the sensitivity values of these samples?**

A:

- Day 1 – 40%
  - Day 2 – 50%
  - Day 3 – 60%
- |   |             |
|---|-------------|
| } | sensitivity |
|---|-------------|

**Q: what are the causes of the false +ve urine cytology?**

A: the false +ve urine cytology can come after

- U.T.I
- Instrumentation
- Indwelling catheter
- Contrast studies
- chemo radiation therapy bladder

**Q: what are the causes of false –ve cytology?**

A: hemorrhage / Hematuria specimen

Low grade TCC.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: how will urinary cells appear in TCC?**

A: large hyper chromatic (Blue) cells with large Bizarre nuclei.

**Q: how are the various urinary molecular markers?**

A

	Sensitivity	Specificity
Cytology	50%	95%
BTA stat/track	60%	70%
NMP – 22	70%	80%
Immunocyt	80%	80%
Uro vision (FISH) (3,7,17,9)	80%	95%

**Q: what is the current practical status of urinary markers?**

A:

- Only cytology is used as marker practically
- FISH is indicated in equivocal cases
- Combination of cytology + cystoscopy is the best one.

**Q: for which chromosomes, currently available FISH probes can detect mutation**

A: 3,7,17 & 9 can be detected.

**Q: what are the % chances of LN +ve in various stages of Ca-bladder?**

A:

- T1 – 05%
- T2 – 20%
- T3 – 40%
- T4 – 60%

**Q: what are the % chances of positivity in angry red lesions and random biopsies?**

A:

Angry Red lesions	10%
Random Biopsies ( white light)	10%
Blue light	20% added benefit rate
NBI	20% added benefit rate
ReTURBT	30%

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q. Once USG has depicted mass what next will you do (CECT abd+ pelvis or TURBT)?**

A: depends upon the characteristics of bladder mass

- |   |   |                |
|---|---|----------------|
| <ul style="list-style-type: none"><li>- if mass size <math>\geq 3</math> cm</li><li>- Sessile mass</li><li>- Multiple masses</li><li>- Cytology +Ve</li></ul> | } | C.T scan first |
|---|---|----------------|

For low grade, small  $< 3$ cm, single tumour- direct TURBT should be done.

CT **cannot** depict muscle invasion

CT is done for extra vesicle spread and nodal mets

**Q: why CECT first in mass  $> 3$ cm & cytology +ve?**

A:

- chances of L.N mets are more
- Post TURBT CECT can have artifacts related to TURBT.

**Q: what is super-impose Cystogram or super-impose cystography?**

A:

- principle ; detrusor muscle infiltrated with tumour does not contract well  
So part of detrusor which is having muscle deep disease or extra vesical spread will not collapse to the same extent as of normal bladder
- Bladder is filled to capacity using a small catheter, block the catheter and take a full bladder film, now empty 100 ml and take the film on the SAME x-ray plate. Empty another 100 ml and take the film on the same plate .repeat after emptying another 100 ml. This is called super imposed Cystogram.
- The wall of the bladder that is not collapsing is having muscle deep disease or extra vesical disease.

**Q: Describe the operative procedure of TURBT?**

A:

Ind<sup>n</sup>: Urinary Bladder tumour, on imaging studies

Consent:

- Pt is explained about his disease and need for TURBT.
- It is clearly mentioned that it is not a complete treatment and further course of management depends upon the H.P.ex<sup>m</sup> report of TURBT.
- It is also mentioned that post TURBT one immediate cycle of MMC will be instituted.
- Other technical points like G/A ,time duration (1 hour) of surgery & complications like infn, Bleeding, need for catheterization, Trauma and bladder perforation are explained

Pre OP day:

- File check & Investigation alignment
- Inj<sup>n</sup> TT, enema,
- Cardiac , anesthetic fitness,
- Part preparation

On the Day of Surgery

- Antibiotics (as per urine culture report)
- Pulse /BP, (if HTN)
- Electrolytes (if need)
- Morning sugar (if DM)

Anesthesia

- Gen anaesthesia + added muscle relaxants
- Surgeon must be present in OT before anaesthesia induction
- Position to be given by surgeon and not technician.
- Ipsilateral leg is doubly secured(so that the leg doesnot move in obturator jerk)
- Contralateral leg is abducted more out(to accommodate surgeon, scope movements )
- Caultry pad on contralateral thigh (if unipolar, so that the current travels towards the contralateral side-thus minimizing obturator jerk)
- Preferable use Bipolar caultry

**Do rectal Examination & Bimanual examination under anesthesia--Marshall's staging**

Check the instrument trolley 30° – 70° scopes, Otis dilator, Ellick's evacuator, Resectoscope.

- The surgeon scrubs now

**Operation:** Painting & drapping done

- Take a 15.5 cystoscope sheath & do a urethroscopy, evaluate prostate and enter bladder
- Use saline for cystoscopy
- Look for both ureteric orifices

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Complete a thorough cystoscopic evaluation on Right side fl/by left side.
- Press suprapubically and check dome (invert scope for looking in this maneuver)
- Take 70° scope & check bladder neck area (contd)

### **Contd TURBT**

- Make note of all the tumours and suspected angry looking areas
- Dilate the ant. Urethra using Otis dilator
- Change to continuous Resectoscope
- Use Glycine for resection
- Partially filled bladder
- Measure the size of Bldr tumour
- Keep the loop behind/ beyond the tumour
- Resect with cutting current (piece meal)
- Give wash and collect all superficial Bits
- Take a deep muscle bite & collect separately
- Achieve hemostasis
- Deploy Foleys & start irrigation

### **Re-do-the Bimanual examination.**

Post TURBT give MMC in recovery room as MMC decreases local recurrence by 12% (ABC meta analysis)

### **Q: what all things will you see for in USG in a case of ca bladder?**

A:

1. Heterogenous (hyperechoic) mass protruding into lumen of Bladder; which does not change position (in prone) (v/s blood clot)
2. Bladder wall thickness ( n= 5-6 mm)
3. Prostate / median lobe
4. Position of mass (w.r.t ureteric orifice)
5. HUN
6. Liver, spleen, ascitis.

### **Q: what next → CECT → why CECT?**

A: This CT is not for diagnosis of muscle infiltration state but as post TURBT will lead to perivesical stranding & may then mislead the staging: also nodal involvement is difficult to assess.

### **Q: after TURBT, when will you do CECT?**

A: after 21 days

### **Q: what is the importance of bimanual examination under anaesthesia?**

A: bimanual examination used to help in staging of the bladder mass. It was based on the presumptions that

- most bladder masses are palpable in bi manual fashion
- Masses which are limited to bladder only (upto clinical stageT<sub>2</sub>), after TURBT should disappear in post TURBT bimanual examination
- Masses which extend beyond bladder limits (stage T3b or beyond), will persist to be felt in bimanual examination done after TURBT.
- With the advent of CT scan this test has lost its importance



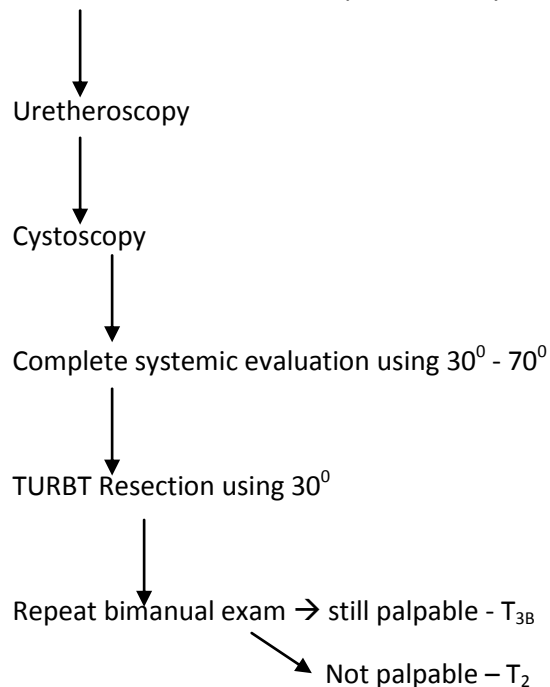
## **Neeraj Sharma's ...Notes For Urology Practicals**

- Especially if you have opted for a ct scan examination before TURBT then there is hardly any use of doing bimanual examination
- But, if you have not done CT scan previously and have opted for TURBT straight-away then bimanual examination can be of some help.

The sensitivity and specificity of bimanual examination is very low

At best it can depict intra-vesical limited disease v/s extra vesical spread (that to macroscopic T3b).

1<sup>st</sup> Bimanual Exn decrease anesthesia → depicts mobility of bladder mass and its size estimation.



**Q: what anesthesia is used for TURBT?**

A: SA + obturator block

GA + muscle Relaxants (Paralyzing agents)

**Q: what is the difference in mechanism of action of the two methods –central v/s obturator block?**

A: Lidocaine given in Obturator block, blocks the fast voltage-gated sodium channels in the cell membrane of post-synaptic neurons, preventing depolarization and inhibiting the generation and propagation of nerve impulses. At lower blood concentrations, sensory neurons are primarily affected while at higher concentrations the effects become generalized for motor and sensory both.

Centrally acting muscle relaxants operate by competing for the cholinergic receptors at the motor end plate thereby exerting its muscle-relaxing properties

**Q: how will you give Obturator block?**

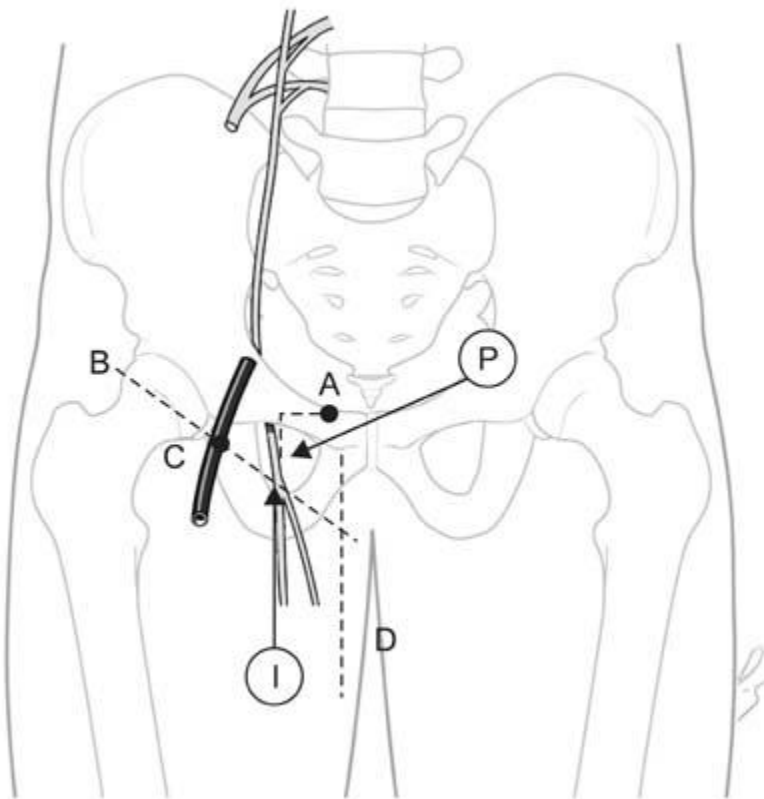
A:

1. Blind technique
2. with nerve stimulator
3. With USG guidance

Classical blind technique is known as **Labat's technique**:

Stand face to face with patient with ipsilateral thigh 30° abducted

- Puncture from the point 1.5 cm inferolateral to pubic tubercle go perpendicular to skin deep with 24 G /8 cm needle.
- Hit the pubic rami.
- Pass underneath and rotate 45° direct towards ipsilateral axilla, move 2 to 3 cm forward → inject 20 ml lidocaine
- Otherwise use nerve stimulator (with adductor jerk) or USG guided
- Please read **the Comparison of the success rate of inguinal approach with classical pubic approach for obturator nerve block in patients undergoing TURB** Korean Society of Anesthesiologists, 2011, Youn Yi Jo,



The obturator nerve block. A: pubic tubercle, B: inguinal crease, C: femoral artery, D: inner border of the adductor longus tendon, P: needle insertion point for the conventional pubic approach, I: obturator nerve.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what else can you do to prevent obturator jerk?**

A:

- GA+ muscle paralyzing agents
- Use of Pure cutting current
- Taking Small cuts (rapid paddling)
- Stepwise cuts
- Laser or LASER for that part of tumour fulguration
- Bipolar cautery (bipolar cautery does not completely eliminate the chances of obturator jerk)

**Q: does use of bipolar cautery lead to elimination of obturator jerk?**

A: bipolar cautery does not completely eliminate the chances of obturator jerk

**Please read ----Monopolar versus bipolar transurethral resection of bladder tumors: a single center, parallel arm, randomized, controlled trial.**

Venkatramani V, Panda A, Manojkumar R, Kekre NS.

J Urol. 2014 Jun; 191(6):1703-7.

**Q: what will you choose for cutting TURBT?**

A:

- 30° telescope
- Pure cutting current
- Half filled bladder
- Continuous irrigation Iglesias sheath with schmidtz visual obturator
- Thin loop
- Glycine irrigation.

**Q: what will you do for mass in bladder diverticulum?**

A:

- piecemeal resection
- Remove as much as tumour (with perforation mostly) fulgurate the base
- Usually T<sub>3a</sub> / T<sub>3b</sub>
- Partial / complete cystectomy is advisable

**Q: how will you resect tumour behind median lobe?**

A: raise bladder base with finger in rectum or do TURP median lobe resection.

**Q: how will you do hemostasis in TURBT?**

A: using Bug bee electrode

Use ball electrode-Remove the electrode from coagulation site before discontinuation of current

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the complications of TURBT?**

A:

- Bleeding
- Perforation
- Incomplete resection
- Obturator Jerk
- TUR syndrome
- Ureteric orifice injury

**Q: how will you identify that the bladder perforation is extra peritoneal or intraperitoneal?**

A: findings suggestive of intraperitoneal injury

1. Site of injury (dome)
2. Abd distention (+)
3. contrast is given intravesically (preferable head low position)

**Q: how can you confirm that the bladder perforation is extra peritoneal or intraperitoneal?**

A: instill contrast intravesically and take X-ray after 5 min

Ground glass appearance –intraperitoneal-needs surgical exploration and repair

If flame like appearance then → extra peritoneal - can be managed conservatively.

**Q: how will you enhance the yield of cystoscopy?**

A: fluorescence cystoscopy / Blue light / NBI / Optical coherence tomography

Use photoactive porphyrins 5-ALA/ HAL

Inject 2 hour before cystoscopy, Lesion appear red on blue light

22 % added benefit detection rate.

**Q: what laser can you use to fulgurate bladder tumour?**

A: NDYAG: penetration 6 mm

**Q: what is Lintis plastica bladder?**

A: when whole of the bladder wall is involved in tumour, like in Lintis plastica stomach.

**Q: suppose there is an air bubble in dome and a tumour also?**

A: invert the scope, take above the water level & open the outlet

Try changing the position of patient

Put a RCG & suck.

**Q: why some intravesical explosions are heard during TURBT?**

A: due to air in contact of electrodes. air bubble that comes in contact of electrode gets charged up and hot leading to small blasts intravesically.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the composition of air bubble in TURBT?**

A: bubble that is generated as a result of resection process is NO<sub>2</sub> and CO

bubble that is generated as a result of frequent in and out instrumentation is equivalent to room air composition

**Q: when will you do Re-look TURBT (staging TURBT)?**

A: after minimum of 14 days (40% chances are there to get a tumour again)

Change of upstaging from T<sub>1</sub> → T<sub>2</sub> in 25 – 30 %

**Q: in what % of tumours “no muscle elements” is seen?**

A: 30 – 50%

**Q: what are the indications for Re-look TURBT?**

A:

- Ta- high grade or T<sub>1</sub>-high grade on initial biopsy
- “No muscle” seen on initial biopsy.

**Q: who proposed the theory of tumour seedling due to TURBT?**

A: soloway

Soloway studies proved that free tumour cells can seed on to different areas & cause tumour recurrence

Soloway studies also formed the basis of just peri-operative (1-6 hrs) mitomycin-c instillation

**Q: Can TURP & TURBT be combined?**

A: yes; they can be combined but better avoided

Evidence in literature is sparse

**Q: do random bladder biopsies increase the chance of tumour seeding?**

A: theoretically yes; but practically No.

**Q: what is the status of immediate post-op MMC after TURBT?**

A: Routine immediate post op mmc is a standard practice in our institute

- Ideally within 6 hrs of TURBT
- Can be given upto 24 hrs of TURBT; no use after that.

**Q: On whose work this post op mmc is given?**

A: Soloway → free tumour cells can cause seeding

Zinke H- et al → mmc kills free tumour cells and thus prevents seeding .

Please read-- **Intravesical Thiotepa and Mitomycin C treatment immediately after transurethral resection and later for superficial (stages Ta and Tis) bladder cancer: a**

**prospective, randomized, stratified study with crossover design. J Urol 1985; 134: 1110–1114. Zinke H- et al**

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the advantage of giving mmc post op?**

A: reduces the recurrence the rate by = 12% {from 48% to 36% (**ABC Meta analysis**)}

**Q: how much mitomycin do you instill?**

A: 40mg for 1 hr

**Q: what are the indn for mitomycin maintenance therapy?**

A:

- Recurrent T<sub>a</sub>-low grade
- 1<sup>st</sup> time - T<sub>1</sub> low grade .

**Q: what else can be instilled (just post operatively)?**

A: Epirubicin 50mg, doxorubicin 50 mg

**Q: what are the contraindications for mmc instillation post op?**

A:

- extensive resection
- incomplete resection
- Bladder Perforation
- Uncontrolled hematuria

**Q: can BCG be administered safely on just post op?**

A: no, never

Can cause bacterial sepsis & even death.

**Q: do you give post op mmc to all TURBT pts?**

A: to only those; in whom tumour appear to be low stage low grade  
(Single, primary, papillary lesions)

**Q: suppose the pt had pre -op urine cytology +ve ; will you still give post op mmc?**

A: pre op urine cytology +ve usually means high grade malignancy

There is no proven data that mmc (post op) will help, but there seems no harm also

Final histopathology report may be different than expected one

So I will give post op mmc

**Q: what is the mmc maintenance schedule?**

A: initial TURBT → cycle -I -mmc wk - 1

Check Biopsy report → cycle- II- mmc wk -2

Cycle- III - mmc wk -3

Re- TURBT → cycle- IV mmc wk - 4

Check Biopsy → cycle -V mmc wk - 5

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: when can you give mmc maintenance mitomycin schedule?**

A: low grade T<sub>a</sub> } ABC -> advanced bladder cancer meta analysis  
Low grade T<sub>1</sub> }

**Q: what is the gain of mmc maintenance?**

A: decrease the recurrence by 12% (ABC Meta-analysis)

**Q: Is there any effect on disease progression?**

A: No

**Q: how can you increase the efficacy of mmc?**

A;

- Overnight fasting
- Dehydrating the pt (a bit)
- Using NaHCO<sub>3</sub> (sodium bi-carbonate) oral tab 2 hrs before
- Increase the concentration of drugs
- Microwave therapy.

**Q: what are the findings of soloway study?**

A:

1. Re-TURBT is must; tumour upstages in 30% cases
2. TURBT leads to tumour seed implant
3. Post op mmc prevents / reduces tumour local recurrence by 12%

Soloway study was later in-cooperated in ABC Meta-analysis.

**Q: what is the chance of recurrence of NMIBC tumour?**

A: recurrence risk is calculated by EORTC risk calculator of recurrence (by Sylvester)

- No of tumour
- Size of tumour (< 3cm ) (>3cm)
- Prior H/O recurrence
- CIS
- Grade stage T<sub>a</sub> /T<sub>1</sub>

This nomogram can calculate

1. Risk of recurrence after TURBT
2. Risk of progression to MIBC

For Recurrence

- No of tumours
- Prior recurrence
- Tumour size

## **Neeraj Sharma's ...Notes For Urology Practicals**

For Progression

- Tumour category
- Grade
- Cis

**Q: in mitomycin –c, what does 'C' stand for?**

A: Mitomycins are family of aziridine natural products isolated from “streptomyces”. Not all mitomycins are anti cancer agents. The molecule which is used as “ chemotherapeutic” agent is known as mitomycin – C.

**Q: what are random biopsies?**

A: during cystoscopy, cold cup Biopsies taken randomly from normal looking areas is known as random biopsies.

**Q: what are the ind<sup>n</sup> for random biopsies?**

A:

- multiple tumours
- Positive urine cytology with negative cystoscopy + negative upper tract imaging.
- Prostatic urethral loop biopsy when neobladder formation is anticipated.

**Q: from which parts of bladder will you take random biopsies?**

A: one biopsies each from-Trigone, Bladder dome, Right lateral wall , left lateral wall, anterior & posterior bladder walls.

**Q: what us the present status of random biopsies?**

A: EORTC report says that random Biopsies are not warranted in low risk patients like

- Low grade tumour
- Solitary
- Small
- Papillary tumours
- Negative cytology

Random biopsies are generally taken during Re-look / Re-stage TURBT

(Especially when original biopsy report comes as low grade tumour with cytology +ve)

Thus only pts with

1. +ve cytology;
2. multiple tumours
3. Suspected angry looking areas
4. Contemplating Bladder preserving protocols are subjected to random biopsies



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what % of random Biopsies finally comes +ve for malignancy?**

A: 10-12% of random Biopsies are +ve when taken from 'High-Risk' pts.

**Q: what % of "angry red" areas will finally come +ve for CIS/ malignancy?**

A: 10% of angry red areas will finally come +ve for CIS/ malignancy

**Q: when will you take prostatic urethra Biopsies?**

A:

- Visible abnormalities of prostatic urethra
- Tumour involving bladder neck or Trigone.
- Anticipating the need for Neobladder construction.

**Q: how and from where will you take the prostatic urethral biopsy?**

A: Take resection loop biopsy between 5-7 'o clock positions.

**Q: what is the status of Repeat TURBT?**

A: there are three possibilities on initial TURBT report

1. Muscle not seen → repeat TURBT – must
2. Muscle seen → infiltrated → no need of Re- TURBT
3. Muscle seen → not infiltrated.--do re-TURBT.

Consensus statement: Only for low grade low stage Ta(low grade-Ta G<sub>1</sub>), Re-TURBT is not needed ;  
For everyone else → do Re-TURBT

**Q: when will you do Re-TURBT?**

A: No fixed time but generally in 4<sup>th</sup> wk (can be done 2-6 weeks after initial TURBT)

**Q: what all will you do in Re-TURBT?**

A: complete cystoscopy for new growth / residual growth

Re- resect the previously scarred areas and the resected margins

(Do random biopsies if needed, do prostatic urethra biopsy if needed)

**Q: what % of pts will upstage on Re-TURBT?**

A: 25-30% upstaging (Soloway et al)

**Q: how to enhance the yield (increase sensitivity of cystoscopy)?**

A:

- Narrow band imaging (NBI)
- Optical coherence Tomography

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is different in NBI scope or light source?**

A: scope is ordinary scope, Light source is different (It has a filter which when turned on gives Blue-green light)

**Q: what is the appearance of suspicious area?**

A: Brown in colour

**Q: How will you assess depths of invasion?**

A: Optical coherence tomography

**Q: what are the ind<sup>n</sup> for doing photodynamic or fluoroscopic cystoscopy?**

A:

- positive urine cytology with no visible Bladder tumours
- History of high grade tumour (in initial resection)
- Contemplating Bladder preserving protocol subject to availability of instrument.
- Subject to availability of instrument.

**Q: what is the advantage of fluorescent cystoscopy?**

A: 22% added Benefit rate.

**Q: what will be the tumour appearance in fluorescent cystoscopy?**

A: pink tumour against blue back ground

Tumour cells will absorb more ALA.

**Q: how is fluro-cystoscopy done?**

A: intravesical instillation of 5-ALA (HAL – Hexa levulinic acid) one hour before doing cystoscopy

- The blue light is illuminated inside bladder for cystoscopy.
- Fluro-cystoscopy is also called blue light cystoscopy.

**Q: what is narrow band imaging?**

A: light of narrow band wavelength 420nm to 540nm (blue-green light) is illuminated inside bladder

- Narrow band light is differentially absorbed by Hb and scattered back.
- Sensitivity of NBI is >95%; specificity 80% (Herr et al)
- Sensitivity of which light is > 80% ; specificity 85%

**Q: what is the colour of tumours in NBI?**

A:

- Brown tumour against pink background
- NBI can also be used to find post BCG recurrence.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is optical coherence tomography?**

A: OCT is a signal acquisition & processing method software near infra red light (having long wavelength) penetrates deep into tissue & absorbed differently by different tissues & scattered back study analysis of this scattered light leads to generation of histological appearance by software.

---

***B.C.G*** 30-40

**Q: what does BCG stands for?**

A: BCG commonly referred to as **Bacille de Calmette et Guérin** or BCG

***pneumonic to remember BCG effect as there are 30-40% reduction in progression of disease as well as 30- 40 % reduction in recurrence of disease so it is nick named here as BCG*** 30-40

**Q: where is BCG used in Ca bladder?**

A: used for NMIBC high grade T<sub>1</sub>G<sub>3</sub>, or CIS

**Q: what is the Bacteria used in BCG vaccine?**

A: Mycobacterium Bovine

**Q: Who discovered BCG vaccine?**

A: Albert Calmette: Physician in pastur institute

Guerin: lab technician (veterinarian)

**Q: what is the other major invention by Calmette & Guerin ?**

A: anti snake venom

**Q: who discovered BCG for Bladder tumour Mx?**

A: 1976 Morales used first

**Q: What is the CFU count of Danish 1331 strain ?**

A:  $2-6 \times 10^8$  CFU /ml

**Q: what is the BCG drug you use?**

A: Onco-Vac (Zydus cedilla) (Lyophilized)

Rs. 590/- per 40 mg vial

**Q: What is the mechanism of action?**

A: mechanism of action

Bacteria enters urothelium (micro-pinocytosis)



Release Cytokinins



Dendritic & macrophage stimulation



Activates cell mediated immunity

**Q: What are the various strains used?**

A:

- Frappier strain
- Danish strain
- Pasteur strain
- Japanese strain (maximum colony forming organism)
- Connaught ,

**Q: what is the most important factor you see in the BCG strain?**

A: colony forming organism

- More the number of colony forming organism (C.F.U) better is the response
- Dose can be reduced in high 'C.F.O' strains

**Q: what happens when bacteria is cultured again & again?**

A: bacteria losses virulence but antigenicity is maintained

**Q: what is the dose of BCG?**

A: 120 mg std dose, but actually depends upon CFU of that strain.

**Q: when can you instill BCG after TURBT?**

A: atleast 2 wks after TURBT (usually 4 wks).

BCG should not enter blood vessel → causes BCG sepsis/Bacterial sepsis.

**Q: what is the dwell time?**

A: 1 – 2 hrs dwelling time (Moralles et al)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the induction course protocol?**

A: Induction course--After 2-4 wks of initial TURBT  
Weekly courses X 6 times



Moralles et al

**Q: when to repeat induction course?**

A: BCG recurrence  
Persistence of CIS

**Q: what is BCG recurrence / relapsing?**

A: It is also called BCG reLapsing → Lost but come again

**Q: what is BCG refractory?**

A: Persistence of disease after 2<sup>nd</sup> course of BCG (Campbell → non-improving or worsening despite BCG)

**Q: what is BCG resistant?**

A: Recurrence or persistence of disease but in lesser degree, stage, grade

BCG failure types –Pneumonic and aid to memory

BCG reLapsing

Lapse = means lost or nullified

disease recurrence after a  
disease free period of 4-6 weeks

L= lost once

ReLapse= occurred again after  
LOST completely

BCG recurrance

To re-occur

Same as BCG relapsing

BCG refractory

Refrain means completely  
Disobedient or not complying

Disease that refrains from  
improving rather deteriorates

Refractory= showing refrainment

ReFractory

Fully Fail treatment

BCG resistant

BCG reSISTANT

PerSISTANT disease but in  
lesser degree, stage, grade

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is maintenance protocol?**

A: 3 – weekly instillation on 3<sup>rd</sup>, 6<sup>th</sup> month and then @ 6 month for 3 yrs (max)  
LAMB-PROTOCOL (SWOG – protocol)

### **Q: what 3x weekly instillation are given**

A: Urinary cytokines reaches peak by 3 wks so 3-weekly instillation & remain for 6 months.

### **Q: what are the indn for BCG?**

A: Intermediate grade or High grade NMIBC or CIS

### **Q: what is the role of BCG in Ca – bladder?**

A: In C1S – complete response 80%  
Long durable response 50%  
Decreases risk of progression to 20% (otherwise it is 95%)

In T<sub>1</sub>G<sub>3</sub> : recurrence risk is decreased by 40% (from 60 → 20)

Delays the interval of progression by 30% (30 → 20 month)

### **Q: what is the status of BCG in Rx of T<sub>1</sub>G<sub>3</sub>?**

A: T<sub>1</sub>G<sub>3</sub> → with any two risk factors like

<ul style="list-style-type: none"><li>- size &gt; 3cm</li><li>- multifocal tumour</li><li>- concomitant CIS</li></ul>	}	do early cystectomy rather than BCG.
---	---	--------------------------------------

For T<sub>1</sub>G<sub>3</sub> with no other risk factors → given BCG

### **Q: what are the factors predicting BCG efficacy?**

A:

- AGE less than 70 yr (patient's immune system should be working well to respond)
- 1<sup>st</sup> negative cystoscopy → tumour responding well
- Tumour size < 3cm → good features.
- H/O recurrence
- Early recurrence

### **Q: what are the good factors for predicting good response in BCG?**

- |  |   |                       |
|--|---|-----------------------|
| <ol style="list-style-type: none"><li>1. Age &lt; 70 yr</li><li>2. 1<sup>st</sup> check cystoscopy – neg</li><li>3. Tumour size &lt; 3 cm</li><li>4. No H/o prior recurrence</li></ol> | } | good factors for BCG. |
|--|---|-----------------------|

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the poor prognostic factors for BCG?**

A: Tumour related

- Size > 3cm
- Concomitant CIS
- Recurrence @ 1<sup>st</sup> check cystoscopy
- Multiple tumours

Patient related

- Age > 70
- DM – uncontrolled
- Immuno compromised Pt

**Q: what is the name of BCG Toxicity classification grading?**

A: Cleveland (USA) clinic grading of BCG toxicity

Mild, moderate & severe.

**Q: what is the m/c side effect of BCG?**

A: LUTS

**Q: how can you reduce BCG toxicity?**

A:

1. Dose reduction = max dose reduction by 1/3<sup>rd</sup>
2. Dwell time reduction – minimum 30 mins dwell time is required
3. Concomitant use of ofloxacin can be tried
4. Combine with IL<sub>2</sub>

**Q: what are the contra indications for BCG administration?**

A:

- Immediately post TURBT
- Traumatic catheterization (delay BCG) instillation for 1 wk)
- Gross hematuria
- Total incontinence
- Immuno compromised pt
- Personal h/o of BCG sepsis

} absolute C/I

- Liver disease
  - UTI
  - Advance age
  - Personal h/o TB
- } relative contraindications

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is Cleveland clinic grading of BCG toxicity?**

A: LUTS + HEMATURIA + FEVER

	Symptoms	I <sub>x</sub>	M <sub>x</sub>
GRADE I	LUTS (mild) Mild hematuria Fever (mild) Symptoms =/< 48 hrs	Urine culture Rule out UTI	Anticholinergics Terol-LA Antispasmodic (meftal-spas) analgesics- NSAIDS
GRADE II	LUTS (severe) Hematuria (moderate) Fever (moderate) Symptoms lasting >= 48 hrs	Urine culture LFTS CXR - PA	All above +INH 300 mg /day + rifampicin 600mg/day + consider BCG dose reduction.
GRADE III	LUTS Hematuria (severe) Fever (high grade) Joint pain, Rashes. Solid organ involvement Lung / kidney/ liver Epididymis / prostate	All above	All above + ID reference, +full dose AKT x 3-6 months + consider Prednisolone 40 mg/OD for hemodynamic instability.

**Q: what is the effect of BCG on tumour recurrence?**

A: reduces the chances of recurrence by upto 40% (30 % to 40 %)

Remember BCG **30-40**

**Q: what is the effect of BCG in tumour progression?**

A: reduces the risk of progressing by upto 40% (30 % to 40 %)

Remember **BCG 30-40**

- Poor tolerability , IPSS > 15

**Q: who suggested the need for maintenance BCG?**

A: Lamb et al

Morales → ind<sup>n</sup> course

Lamb / SWOG → maintenance course

**Q: who described that “ more than 2 BCG induction cycles are useless?**

A: Catalona & Nadler

**Q: what is the name of current maintenance protocol?**



## **Neeraj Sharma's ...Notes For Urology Practicals**

A: SWOG protocol.

**Q: what is current SWOG protocol?**

A: Induction course 6 x weekly'

3-x Weekly @ 3 months & 6 weeks & then every 6 monthly for upto 3 yrs

**Q: what was the final outcome in SWOG study?**

A: recurrence reduction by 40%

Progression reduction by 30%

**Q: what is the time for maximum dropout rate?**

A: with first 6 months (50% drop out)

**Q: what is the present status of BCG maintenance?**

A: should be given for upto 1yr atleast.

**Q: what are the novel agents for intravesical use?**

A:

- KLH → keyhole limpet hemocyanin
- Bropiramine → oral drug
- Garlic extract
- Mycobacterial cell wall DNA extract
- IL – 2

**Q: what are the major intravesical agents?**

A:

- mmc            40mg
- BCG            120 mg
- Epirubicin    50 mg
- Doxorubicin 50 mg
- Thiotepa      rare
- IL<sub>2</sub>

**Q: what is BCG refractory?**

A: Persistence disease (non-improving / worsening) After 6 wks of BCG → BCG refractory.

**Q: what is BCG resistant?**

A: persistence in lesser degree, grade or stage

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is BCG relapsing?**

A: complete cure fl/by recurrence (after a disease free period 4-6 weeks) = BCG relapsing = BCG recurrence.

### **Q: how will know that pt is responding to BCG?**

A: clinically → appearance of mild to moderate LUTS

Ix → urine cytology and cystoscopy.

### **Q: Can BCG be given for TCC – prostatic urethra?**

A: Yes, Do TURP

- If only mucosa involved  $T_a$ ,  $T_1$  then give BCG
- If stroma involved – do radical Cysto-prostatectomy.

### **Q: what is the EORTC Risk stratification for NMIBC?**

A:

EORTC risk category

Tumour description

Low risk :

Single small  $T_a$ - low grade.

Intermediate:

multiple  $T_a$  low grade  
Single  $T_a > 3\text{cm}$   
Single  $T_1$  low grade

High risk :

Any  $T_a/T_1$  with high grade  
CIS

### **Q: what is BCG 30-40?**

A: for any BCG Rx given Risk red<sup>n</sup> for recurrence = 30-40%

Risk red<sup>n</sup> for progression = 30-40%

Herr/Sylvester Study

### **Q: what are the ind<sup>n</sup> for early cystectomy in NMIBC?**

A:

- $T_1G_3$  with multiple tumours
- $T_1G_3$  of Diverticulum
- $T_1G_3$  with CIS / LVI +ve
- Recurrent  $T_1G_3$
- BCG refractory  $T_1G_3$  / CIS
- Primary tumour size  $> 3\text{cm}$
- ?? Node +Ve on CT scan
- $T_1G_3$  Involving ureter, prostate.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the advantage of early cystectomy (40-80) in T<sub>1</sub>G<sub>3</sub>?**

A:

- 40% of NMIBC on TURBT become MIBC on Cx(cystectomy)
- 40% of T<sub>1</sub>G<sub>3</sub> eventually progress to T<sub>2</sub>, even after TURBT + BCG ind<sup>n</sup> + BCG maintenance
- Study – ABC meta analysis
- 10 yr survival after early Cx is 80% (stein et al, shariat et al)
- But 10 yr survival after T<sub>1</sub> G<sub>3</sub> + BCG → fl/by C<sub>x</sub> is 50%

**Q: Can Radiotherapy be given for T<sub>1</sub> G<sub>3</sub>?**

A: BCG + Radiotherapy can be given

- QOL is very poor
- Response rate is poor.

**Q: what are the types of BCG failure?**

A:

Refracting → full failure futile

Relapsing → lost but come again

Resistant → Persistent but in lesser degree.

**Q: what are the components of fl/up?**

A: PC<sup>3</sup>

- Phy exam
- Cytology
- Cystoscopy
- CECT upper tract

**Q: what are the fl/up protocols for NMIBC?**

A:

<b>RISK</b>	<b>phy exam /cystoscopy /cytology</b>	<b>CECT Abd</b>
<i>Low</i>	@ 3months @ 1 yr (9 month after) @ yearly x 5yr	no need
<i>Intermediate</i>	@ 3 mo x 1yr @ 6mo x 2 yr @12 mo x 3, 4, 5 yr	Baseline fl/by @ 2 yrs
<i>High risk</i>	@ 3 month x 2 yr @ 6 mo x next 2 yr @ 12 mo x lifetime	annually x 2 yr then lengthening the intervals

**Q: what are the indn for early cystectomy?**

A;

- Diffuse CIS
- T<sub>1</sub>high grade large mass
- BCG refractory
- Tumour in diverticulum /any unassessible site
- Multiple recurrent T<sub>1</sub> high grade with LVI/ large > 5cm
- Involvement of prostatic urethra / ureter
- Residual on 2nd look TURBT

---

## **Muscle Invasive Bladder Cancer MIBC**

**Q: what is the usual patient profile?**

A: A patient roughly age between 60 to 70 ; presenting with gross painless hematuria; USG s/o bladder mass TURBT done; Biopsy s/o muscle infiltration.

**Q: Out of all pts of MIBC; what % of pts are de-novo MIBC and what % are NMIBC → MIBC?**

A: de-novo MIBC → 70-80%

NMIBC → MIBC → 20-30%

- T<sub>a</sub> → 10%
- T<sub>1</sub> → 20%

**Q: will you like to do a Re- TURBT in this Pt having MIBC as initial biopsy?**

A: Not required generally, Only if;

1. A Bladder sparing (partial radical Cx) is contemplated then to do a bladder mapping re-TURBT is done
2. If orthotopic neobladder is contemplated then to take prostatic urethra biopsy (if not taken in 1<sup>st</sup> TURBT)

**Q: What Ix do you want to do?**

A: CECT abdomen & pelvis (if not done before)

Sr. LDH, Sr AlkPO<sub>4</sub>, Sr Ca<sup>++</sup> , LFTs

**Q: when will you do CECT abdomen after TURBT?**

A: CECT is done after 21 days → to allow the post inflammatory changes to subside.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: which is better option to do CECT before TURBT or after TURBT?**

A: pre TURBT – CECT is better as CT detects peri vesical stranding / infiltration as T<sub>3b</sub> disease

- MRI/CT cannot diagnose T<sub>3a</sub> disease
- Post TURBT there is more perivesical stranding / infiltration so more chances of over staging
- More over post TURBT nodal involvement is also difficult to assess.
- Some patient are lost to fl/up post TURBT assuming that they are cured

### **Q: what is Bow sign?**

A:

- Bow sign is the persistence of the clear fat between bladder and seminal vesicles.
- If there is perivesical infiltration to seminal vesicles then 'bow' sign is lost (bow angle b/w bladder & seminal vesicle is lost).

### **Q: what is the Bow sign equivalent in ca PROSTATE?**

A: Moustache sign

### **Q: how good is CECT v/s MRI in local staging?**

A:

- Previously MRI was thought to be better than CECT for pelvis or local soft tissue appreciation  
T<sub>3B</sub> = perivesical involvement = better seen in MRI.
- With the advent of 128 slice ct and above ,i.e. 128,256,320 ct scanners, for all practical purposes  
CT = MRI,
- more advances 128, 320 slice CT scans are more than sufficient enough for diagnosis
- N<sup>+</sup> nodal involvement = better seen on CT

### **Q: what size of lymph nodes is considered enlarged in CT scan?**

A: more than 8mm in pelvis (ipsilateral of tumour side) and 10 mm in abdomen is considered positive for Ca . Bladder

### **Q: what is the status of PET-CT in staging Ca-Bladder?**

A: Can be used for doubtful nodes.

### **Q: what metastatic, workup is needed?**

A: Sr. Ca<sup>++</sup>, Sr LDH, Sr AlkPO<sub>4</sub>, CXR-PA

Bone scintigraphy & CT brain if pt is symptomatic.

### **Q: what is the 10 yr survival for T<sub>1</sub>G<sub>3</sub> early cystectomy Cx?**

A: 80% (ABC Meta analysis)

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is the TNM staging?**

A: TNM classification of urinary bladder cancer (2009)

Tx- Primary tumour cannot be assessed

T0 -No evidence of primary tumour

Ta -Noninvasive papillary carcinoma

Tis -Carcinoma in situ: "flat tumour"

T1 -Tumour invades subepithelial connective tissue

T2 -Tumour invades muscle

T2a- Tumour invades superficial muscle (inner half)

T2b -Tumour invades deep muscle (outer half)

T3 -Tumour invades perivesical tissue

T3a- microscopically

T3b -macroscopically (extravesical mass)

T4 -Tumour invades any of the following: prostate stroma, seminal vesicles, uterus, vagina, pelvic wall, abdominal wall

T4a- Tumour invades prostate stroma, seminal vesicles, uterus, or vagina

T4b -Tumour invades pelvic wall or abdominal wall

N – Regional lymph nodes

Nx -Regional lymph nodes cannot be assessed

N0 -No regional lymph node metastasis

N1 -Metastasis in a single lymph node in the true pelvis (hypogastric, obturator, external iliac or presacral)

N2 -Metastasis in multiple lymph nodes in the true pelvis (hypogastric, obturator, external iliac, or presacral)

N3 -Metastasis in common iliac lymph node(s)

M – Distant metastasis

M0- No distant metastasis

M1 -Distant metastasis

### **Q: what is the survival probability for a pt who is diagnosed as MIBC at TURBT biopsy?**

A: 5 yr survival is 50%

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Does it mean that for all pts undergoing radical cystectomy 5 yr survival is 50%**

A: Actually it is in general survival rate. Final Histopathology reports matters including

- Perivesical spread
- Number of lymph nodes
- Level of LN involved
- Histology of tumour

**Q: what is the survival for different stages?**

A:  $T_2N_0M_0 \rightarrow$  5 yr survival 60%

$T_3N_0M_0 \rightarrow$  5 yr survival 40%

$T_4$  / or nodal disease  $\rightarrow$  5 yr survival 30%

Metastatic disease  $\rightarrow$  5 yr survival 15%

**Q: when will you give neo adjuvant chemotherapy?**

A: neo adjuvant chemotherapy can be given in the following situations

- For  $T_3$  clinical  $T_3$
- For node +ve
- For  $T_4 \rightarrow$  so shrink the tumor
- $T_2 \rightarrow$  selected cases as of multiple large tumours and high grade tumour/ CIS
- $T_2$  with Para neoplastic syndrome.

**Q: what is the survival advantage after neo – adj chemotherapy?**

A; 5 yr survival will improve by 5%

Nordic trial, SWOG Trial and ABC Meta analysis Reports

**Q: what are the advantages of giving Neo adj chemo Rx over adjuvant chemo Rx?**

A:

1. 5 yr survival benefit by 5% (ABC meta analysis)
2. Neo adj chemo Rx  $\rightarrow$  early control of micro mets
3. Chemo Rx is better tolerated as neo adj
4. Potential reflection of in- vitro chemo sensitivity
5. 20-25% of clinical  $T_2N_0M_0$  are pathologically  $T_3$  or  $N_1$  disease; so giving neo adj chemo-Rx is advisable.

**Q: when can you not give neo adj chemo Rx?**

A: Poor performance status PS > 2 (ECOG)

Impaired renal Function

**Q: within what speculated time (of diagnosis) the radical cystectomy should be performed**

A: within 90 days of diagnosis

## Neeraj Sharma's ...Notes For Urology Practicals

**Q: will you do only cystectomy or cystoprostatectomy?**

A: cystoprostatectomy rather Cysto-prostate-seminovesiculectomy.

**Q: Why is prostate also removed with Rad Cx, whereas bladder is not removed in Rad prostatectomy**

A:

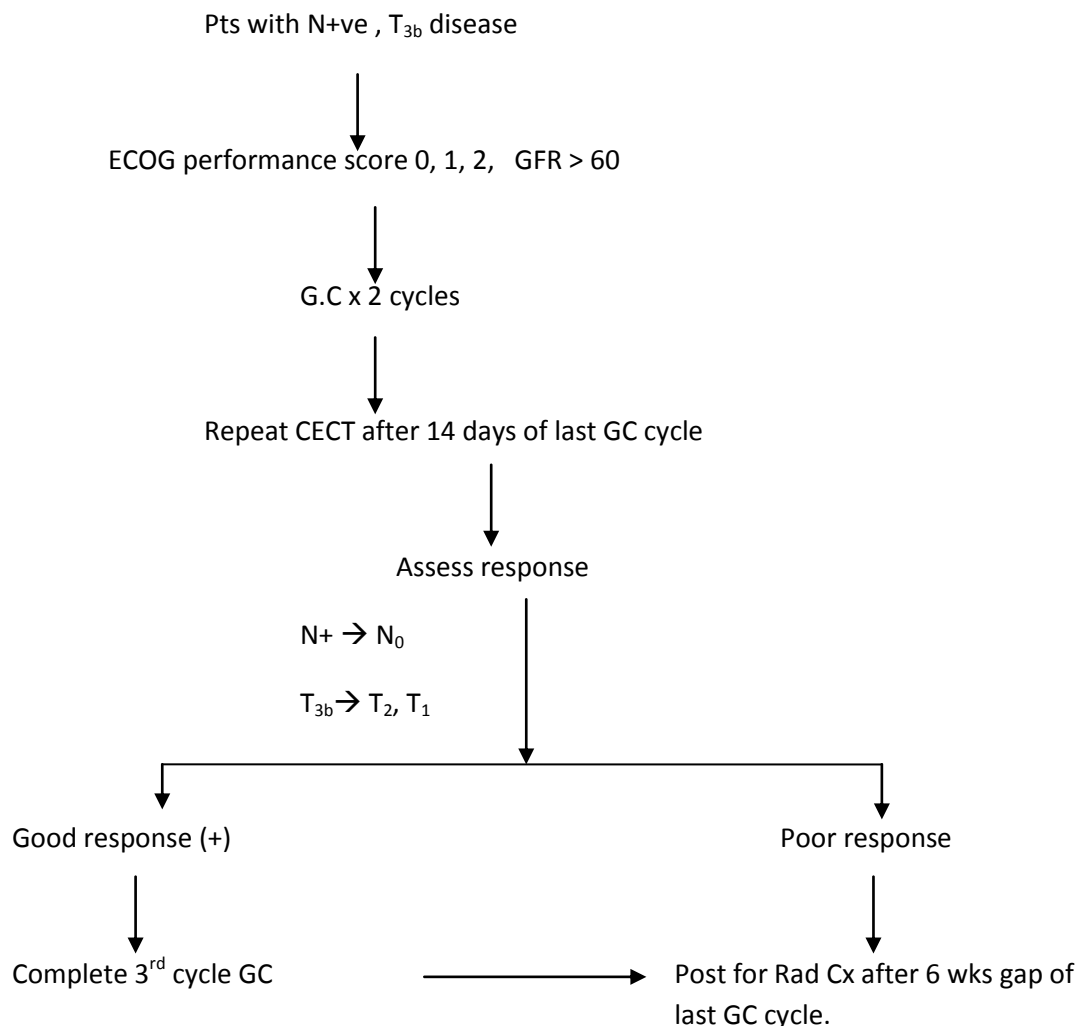
- Ca bladder is a field change disease. Prostatic urethra & ducts are also lined by Transitional cells, So prostate is removed with Radical cystectomy
- Whereas Ca- Prostate is Adenocarcinoma, it is a glandular epithelial (columnar epithelial) disease. So no need of doing cystectomy along with radical prostatectomy.

**Q: what percentage of radical Cysto-prostatectomy specimen will histopathologically show indolent Ca prostate?**

A: upto 25%

**Q: how will you proceed for neo adj chemo & rad Cystectomy?**

A:





## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: will you do lymphadenectomy with Rad Cx?**

A: Yes; always

- Hope= Hypogastric LN
  - Obturator LN
  - Presacral LN
  - External iliac LN
- } pelvic L.N. are definitely removed

**Q: when can you do Rad Cx after GC cycle?**

A: 4-6 wks after last cycle is over.

**Q: Describe the Operation Radical Cystoprostatectomy?**

A:

Ind<sup>n</sup>

1. Muscle invasive bladder cancer T<sub>2</sub>
2. T<sub>1</sub>G<sub>3</sub> early cystectomy.
3. BCG refractory
4. TCC in diverticulum
5. Non TCC – Ca bldr.

Consent:

- Pt is explained about his disease and the diagnosis – MIBC;
- The need for surgery
- The prognosis (5 yr survival 50-60%)
- Organ removed – bladder, - prostate, seminal vesicles
- Pt is explained about ileal conduit & complication
- VAS deferens ligation
- Erectile dysfn
- Gen compln: infn, bleeding, Trauma.

Pre Op Prep

1. 1 point blood reservation
2. Only liquid diet from morning on the day before surgery
3. Oval peglec at 12 to noon
4. NBM 12:00 midnight
5. Ileostomy site marking
6. Inform pathology deptt for frozen section preparation
7. Part preparation nipple to knee.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### On the day of sx

- Morning serum electrolytes, pulse /BP/RBS
- antibiotics → cephalosporin +Metronidazole

Anesthesia: General anaesthesia

Patient position: supine position may be used with table break at pelvis

Low lithotomy – Prostate push, anal dilation, rectal flatus tube

Trendelenberg 15°

Leg slightly separated.

Do foley's catheterization + Flotran boot appl<sup>n</sup> sequential compression device.

Operating surgeon stands on the left side of pt.

### Incision:

Midline vertical infra umbilical, I from 2 cm above the umbilicus to pubic symphysis.

### Steps:

1. make a midline vertical incision
2. Open the skin, subcutaneous, rectus sheath
3. Enter the "space of Reitz" extra-peritoneally and develop the perivesical space pockets on both sides.
4. Open the peritoneum above the level of umbilicus & detach the urachus from umbilicus
5. Cut the peritoneum bilaterally upto the internal inguinal rings (lateral to medial umbilical ligament)
6. Clamp the urachus and pull it out of the incision wound.
7. Reflect the ascending colon / caecum and expose the iliac vessels (on right side). Reflect the descending colon medially and expose the iliac vessels (on left side).
8. Complete the lymphnode dissection in standard template.  
Boundaries of L.N. dissection are  
Superiorly : crossing of ureter over iliac bifurcation  
Inferiorly : coopers ligament  
Laterally : genitofermoral – nerve  
Medially : internal iliac artery.
9. All L.N. packets are separately packed and sent for HP examination (Bouchner's maneuver).  
Deploy a self retaining / book Walters retractor system & pack the bowel away.
10. Ureter is ligated as low as possible and cut. Distal ends may be sent for frozen section
11. Once the lymphnode dissection is complete the bladder is retracted medially so that the superior vesicle & lateral vesicle pedicles get taught and they are dissected ligated & cut.
12. Once the superior & lateral vesicle pedicles are ligated & cut, the bladder can be lifted out of the wound

## **Neeraj Sharma's ...Notes For Urology Practicals**

13. Pull the bladder with urachus out towards pubic symphysis this will tent up the peritoneum b/w bladder & rectum. Make a nick in the peritoneum b/w posterior wall of bladder & rectum.
14. With the use of right hand do blunt dissection and make a plane b/w bladder & rectum
15. Vessels will be seen entering the base of the bladder from posteriorly & bilaterally. This is posterior pedicle. Clip & cut the posterior pedicles bilaterally.
16. Open the Denonviller's fascia between prostate & rectum, separate prostate from rectum. Reach upto the apex of prostate.
17. Drop back the bladder into the field and pull & depress the bladder down wards. This will tent-up the endopelvic fascia which is then opened bilaterally.
18. Manipulating & pulling the bladder; the prostate is coned down upto apex.
19. Dorsal venous complex is ligated distal to the apex; cut; and fixed to pubic symphysis.
20. Prostatic apex is divided from urethra.
21. If a non nerve sparing cystoprostatectomy is being performed then wide excision of neurovascular bundles is done and specimen delivered.
22. Pack the pelvic cavity with sponges.
23. Complete the ileal conduit formation.
24. Deploy urethral foleys as pelvic drain  
Deploy one abd drain  
Close layer wise  
Ileostomy formation.

### **Q: How will you manage post op period?**

A: shift the pt to recovery / ICU

- Post op ECG,
- Post op Hb, PCV, Sr. electrolytes.

Day - 0 – Temp, pulse, BP, SPO<sub>2</sub>, vitals.

Post op, ECG, Hb, PCV, electrolytes

Watch for acidosis (blood loss, ischemia)

Day- 1- Urine output, drain /Output, Temp, P , BP, RS/CVS, ABG

Arterial blood gases analysis with electrolytes, look for ileostomy status & appearance.

### **Q: what are the major compln of Rad cystectomy?**

A: Intra Op

- Hemorrhage
- Rectal injury
- Nerve injury

Immediate post op

- DVT
- Ileus
- Bowel leak
- Lymphocele

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Secondary hemorrhage
- Wound infn
- Ileostomy necrosis
- Stent dislodgment

Late post op

- Short bowel syndrome
- Metabolic compln of ileal conduit
- Ureteric anastomotic stenosis.

**Q: what is the presentation & Mx of Pulmonary embolism?**

A: more than 48 hrs of bed rest.

Unexplained desaturation.

Tachycardia, Tachypnea.

CECT chest → see for pulm embolism

Mx → heparin 5000 units s/c or slow infusion.

**Q: what is the blood supply of bladder?**

A: bilaterally

- Superior vesicle } lateral pedicle
- Inferior vesicle }
- Posterior pedicle

Superior & inferior vesicle arteries are B/O anterior division of I.I.A.

Posterior pedicle is branch of posterior division of IIA

**Q: what are the branches of anterior division of I.I.A.?**

A: Anterior division of I.I.A gives 7 branches

1. Superior vesical
2. Interior vesical
3. Uterine
4. Interval pudendal
5. Sup. rectal
6. Obturator
7. Inferior gluteal

**Q: what are the major points of bleeding in Rad Cx?**

A:

1. Lateral pedicle
2. Posterior pedicle
3. DVC complex.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: how will you identify lateral pedicle, i.e. superior & inferior vesical arteries?**

A: retract the bladder to opposite side and pull the IIA to ipsilateral side this tents up the branches of anterior division of IIA.

### **Q: how will you identify posterior pedicle?**

A: lift up the bladder (with the help of urachus) upward & out of wound, this will initially tent up Denonviller's fascia.

Enter the space b/w rectum (below/posteriorly) and bladder/seminal vesicles anteriorly.

On providing further traction the posterior pedicle will be seen as pillars running up from the lateral sides of rectum to bladder, doubly clip & cut.

### **Q: How will you control DVC?**

A: Take a vicryl 1-0 or 1 number and apply "figure of eight suture" on DVC complex and fix it to pubic symphysis.

### **Q: what are the layers of fascia between bladder & rectum?**

A: peritoneal layer covering the dome of the bladder dips to a variable depth to fuse with peritoneal layer covering the interior wall of rectum. This variable depth pit formed b/w the two peritoneal layers is called pouch of Douglas.

After fusion of these two peritoneal layers the fused sheath is called Denonviller's fascia. So Denonviller's fascia is two layered structure; layers being fused with each other are practically inseparable.

Purely, for the purpose of description the surface of Denonviller's fascia toward the bladder and prostate is called anterior sheath and that towards the rectum is called posterior sheath.

The Denonviller's fascia continues caudally to fuse with endopelvic fascia.

### **Q: what is the plain of dissection b/w rectum & bladder?**

A: the anterior layer of Denonviller's is very difficult to dissect from posterior surface of bladder, prostate & seminal vesicle.

So plain of dissection b/w rectum & bladder is b/w posterior surface of Denonviller's and rectum wall.

### **Q: In which cond<sup>n</sup> the separation of bladder and rectum is difficult?**

A:

1. Prior TURP
2. Prior pelvic radiations.
3. Prior pelvic Sx
4. Bldr tumour infiltration into posterior vesicle space.

### **Q: what type of dissection is done to separate bladder from rectum?**

A: In normal cond<sup>n</sup> → both blunt & sharp

In difficult situations → only sharp dissection.

**Q: how will you manage intra op rectal injury?**

A:

- 5% incidence
- Immediate repair (2 layer) – mucosa, - Lambert suture – interpose omentum (if needed)
- Make decompressing diversion colostomy
- Deploy pelvic drain.

**Q: how can you prevent DVT?**

A: intra op – flotron-sequential compression device

Post Op – early mobilization, - claxane (LMWH)

**Q: what is standard and extended LN dissection?**

A: Standard LN dissection → means removal of hypogastric obturator & ext iliac L.N.

Extended LN dissection means → removal of pre sacral group and common iliac LN also (upto bifurcation of aorta)

**Q: when will you do standard & extended LN dissection?**

A: standard → in clinically N<sub>0</sub> disease

Extended → in clinical N<sub>1</sub>/N<sub>2</sub>

**Q: what is the morbidity & mortality of rad Cx?**

A: peri operative mortality 3%

Early complication (upto 3 months of sx) = 25%

Late morbidity is according to type of urinary diversion.

**Q: what is the survival after Rad. Cystectomy?**

A: for pT<sub>2</sub> 5 yr survival = 60%

For pN<sub>1,2</sub> 5 yr survival = 30%

**Q: enumerate the steps of radical Cx in females?**

A: lithotomy position –mandatory

1. Infra umbilical , midline vertical incision
2. Layer wise opening
3. Development of space of Reitz & perivesical pockets
4. Open peritoneum above umbilicus
5. Cut the urachus & peritoneum upto DIR bilaterally
6. Complete the lymph node dissection
7. Ligate & cut the ureters
8. Control the superior vesical artery & lateral pedicles
9. Once anterior control is over; enter the space behind uterus (b/w uterus & rectum)

## **Neeraj Sharma's ...Notes For Urology Practicals**

10. Complete TAH like hysterectomy
11. Make a nick in post vaginal wall.
12. Extend the vaginal vault incision down along the lateral wall of vagina bilaterally upto exterior.
13. Dissect the space of Reitz; incise the endopelvic fascia and dissect the anterior wall of urethra upto exterior.
14. Deliver the specimen out
15. Close the posterior vaginal wall on itself.
16. Complete the ileal conduit.

**Q: What are the most common sites of mets in ca bladder?**

A: lung, liver, bones

**Q: what are the % chances of LN involvement?**

A:

T<sub>1</sub> – 05%

T<sub>2</sub> – 20%

T<sub>3</sub> – 40%

T<sub>4</sub> – 60%

**Q: what is the role of PET-CT for LN status?**

A: FDG – PET      } can be used  
    11c-PET      }

**Q: what are the commercially available biomarkers?**

A: CEA/ CA-125 / CA 19-9

**Q: what are the absolute C/Ind<sup>n</sup> for urethral sparing surgery?**

A

- Bladder neck tumour in female
- Urethral involvement in female
- Prostatic stroma involvement in male
- Posterior based tumours are relative C/Ind<sup>n</sup>

**Q: why do you want to remove uterus in ca bladder?**

A: bladder lymphatics travel through broad ligaments, so it is imperative to remove uterus.

**Q: what are the boundaries of LN dissection?**

A:

- Superiorly – ureter crossing the iliac vessels
- Inferior – cooper's ligament
- Laterally – genitor femoral nerve
- Medially – int. iliac artery.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what will you see in L.N. biopsy?**

A:

- Total no of LN
- Total no of +ve LN
- Lymphnode density

**Q: what is the most important database in ca bladder?**

A: SEER-Surveillance Epidemiology and End Result

**Q: what is packeting of separate L.N. groups called?**

A: Bouchner's maneuver.

**Q: what stage is becomes if nodal mets above common iliac bifurcation?**

A: M<sub>1</sub>

**Q: what is the minimum number of LN to be removed?**

A: 12 (AJCC)

**Q: what is maximum number of LN to be removed?**

A: 30

**Q: what is extended LND & standard LN dissection called?**

A: Skinner's op<sup>n</sup> → extended LND

Marshall's Op<sup>n</sup> → std. LND.

**Q: suppose while doing Cx you encountered a visible enlarged node/s what will you do?**

A: send the nodes for frozen section, Proceed as planned for Cx, preferably do as extended L.N.D

**Q: when will you abandon the procedure?**

A: I will abandon Cystectomy, when

- L.N. are unresectable
- Tumour is unresectable –
  - peri ureteric infiltration,
  - fixed to Recto-sigmoid
  - Fixed to pelvic side wall.

**Q: what will you do if there is CIS/ intra op frozen section positive at ureteric margin?**

A: CIS @ ureteric margin is of low significance

Doesnot alter the risk of development of subsequent tumour. No hard & fast rule to achieve margin –ve

On left side don't bother and concentrate on the length of ureter.

On right side Re-chop margin as there is adequate ureteric length



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: when will you do urethrectomy in males?**

A: diffuse CIS in prostatic Urethra

Stromal invasion of prostate

+ve apical urethral margin.

**Q: what does Stromal invasion of prostate depicts?**

A: risk of secondary primary tumour in retained urethra is very high

**Q: when will you not do urethral preservation in females?**

A:

- Cancer at bladder neck
  - T<sub>4</sub> stage involving vagina
  - T<sub>3</sub> tumour of bladder trigone
- } C/Indn for orthotopic neobladder also.

**Q: what % of pts will finally die of mets?**

A: 50% will die of mets.

**Q: what is the benefit of neoadj chemotherapy?**

A: 5% survival benefit @ 5 yrs

**Q: what are the chemotherapy options?**

A:

- M-VAC
- gemcitabine +cisplatin

**Q: what are the bladder preserving protocols?**

A:

- Radical TURBT
- Partial cystectomy (Cx)
- Bimodality therapy
- Trimodality therapy

**Q: what are indn for radical TURBT?**

A: Initial occurrence / 1<sup>st</sup> time

No Cis

Size < 3 cm

Stage T<sub>2</sub>

C/I → at dome (do partial cystectomy)

→ T<sub>3B</sub>, T<sub>4</sub>

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the status of radical TURBT for Rx of MIBC?**

A: Not advisable

**Q: what is the status of partial cystectomy?**

A: only for Adenocarcinoma of urachus.

**Q: what is the status of multimodality bladder preserving strategy?**

A: only for highly selective patients

- T<sub>2</sub> on initial resection & on repeat resection
- Unifocal
- NO CIS
- No HN
- Pt well compliant to fl/up

**Q: what are the results of multimodality Rx?**

A: Overall survival 5 yrs = 50% @ 5 yrs

Bladder preservation success = 50% @ 5yr.

Mild to moderate toxicity of chemo /radiation = 50%

## **Adjuvant Chemotherapy**

**Q: what are the indn for adjuvant chemo therapy?**

A:

- pT<sub>3</sub>, pT<sub>4</sub> in biopsy report
- pN+ve in biopsy report
- i.e., if biopsy report suggests an extra vesical spread (pT<sub>3a</sub>) or pathologically node +ve then adjuvant chemotherapy is indicated.

**Q; Why could not you offer neo-adjuvant chemo Px to these pts.?**

A: b'coz on CECT the disease was organ confined (T<sub>2</sub>) with no demonstrable nodes (N<sub>0</sub>) only on pathological HPE report the T<sub>2</sub>N<sub>0</sub>M<sub>0</sub> patient has now become T<sub>3a</sub>/ N<sub>+ve</sub>/M<sub>0</sub>.

**Q: what percentage of T<sub>2</sub> N<sub>0</sub> M<sub>0</sub> pts will become pT<sub>3a</sub> / N<sub>+</sub> after radical Cx?**

A: 10-20%

**Q: what will you do for such patients?**

A: give adjuvant chemo Rx [regimen G.C x 3 cycles]

**Q: what is the survival benefit of giving adjuvant chemo Rx to such patients?**

A: overall survival benefit is doubtful or not established. In any case it is less than 5%.

**Q: What is the guideline statement for giving adj chemotherapy to these patients?**

A: Recommended to give under trials or under care of oncologists  
Not for routine use.

**Q: What are the benefits / disadv of giving adj chemo Rx?**

A:

Adv:

1. Chemo Rx is administered after accurate staging
2. Over treatment avoided
3. No delay in definitive surgical Mx

Dis adv:

1. Assessment of chemo sensitivity in vivo not possible
2. Delay in management of micro mets
3. Survival benefit is not known.

**Q: Is there a role of adj radiotherapy?**

A: as N+ve disease is equivalent to systematic disease; practically there is no use of adj radiotherapy.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the status of neo adj EBRT?**

A:

- Neo adj radiotherapy is good & effective
- Dose – 50 Gy (atleast)
- T<sub>3b</sub> to T<sub>2</sub> conversion rate is >/= 50%
- Reduces risk of local recurrence by 30%
- Improves survival by 5% to 10% (doubtful) (not supported)

**Q: after what time gap will you do radical cystectomy after neo adj EBRT?**

A: after 6 wks

**Q: can neo adj EBRT converts cT<sub>2</sub> tumour to pT<sub>0</sub> ?**

A: yes, about 50% of cT<sub>2</sub> become pT<sub>0</sub> but No cT<sub>3</sub> will become pT<sub>0</sub>.

**Q: what is the difference in indications for neo adj chemo & neo adj Radiotherapy?**

A: neo adj chemo → for node +ve disease

→ Aim is to control micromets

Neo adj radiotherapy → for cT<sub>3/4</sub> disease

→ Aim is to make disease operable.

**Q: what are the guideline recommendations about neo adj EBRT?**

A:

- Should be given to T<sub>3</sub> / T<sub>4</sub>
- Results in down staging after 4-6 wks
- Doesnot improve overall survival
- Only makes the disease operable.

**Q: what is the schedule of EBRT?**

A: 2 Gy daily for 5/7 days a wk x 5 wks

Total = 50 Gy

**Q: what is the sensitivity & specificity of frozen section?**

A: sensitivity 70%

Specificity 98%

**Q: why is there false –ve in frozen section?**

A: Because specimen is frozen in cryostat which leads to cellular disintegration & artifacts

- So false –ve.

**Q: describe the process of frozen section?**

A:

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Specimen → put in fixating sol<sup>n</sup> gel → freeze → fix on cutting machine → cut thin slices → keep on slide → stain → examine.
  - Fixing sol<sup>n</sup> → poly vinyl alcohol
  - Freezing machine → cryostat
  - Freezing temp → -30<sup>0</sup>
  - Cutting machine → microtome
  - Stain = H& E
- 
- Specimen is immersed in poly vinyl alcohol and kept in cryostat. Both specimen & fixating soln become frozen & sock hard at -30<sup>0</sup> c. thin slice of 10 µm is cut by microtome and stained & examined.

## **Non resectable Tumour T<sub>4b</sub> and Metastatic Disease**

**Q: what is clinical stage T<sub>4b</sub>?**

A: tumour infiltrating abdominal wall / pelvic wall.

**Q: what are the symptoms of T<sub>4b</sub> (locally advanced)?**

A:

- recurrent Bleeding
- Pain
- Dysuria
- Urinary obst<sup>n</sup> & uremia
- Severe LUTs (urgency, frequency)

**Q: what is the mechanism of urinary obst<sup>n</sup> in T<sub>4b</sub>?**

A:

1. Mechanical obst<sup>n</sup> of ureteric orifice by tumour
2. Infiltration of ureteric orifice leading to interference with urethral peristalsis  
Both of these factors lead to uraemia.
3. Compression by lymphonodes.

**Q: what are the management options?**

A:

- Palliative cystectomy + Percutaneous ureterostomy + radiotherapy
- Palliative cystectomy alone (symptom relief)
- Radiotherapy alone (symptom relief)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the 'm' staging in TNM?**

A: M<sub>0</sub> → no metastasis

M<sub>1</sub> → distant metastasis

**Q: what are the sites of distant mets in Ca bladder?**

A: lung, liver, bone

**Q: what % of pts have metastatic disease?**

A: NMIBC – 7- - 8%

MIBC – 20 – 30 %

**Q: what % of pts will eventually have metastatic disease after Rad Cx?**

A: 50% of pts undergoing radical cystectomy will relapse in the form of metastasis. Hence dose fl/up is necessary.

**Q: how will you stratify the patients with Ca- Bladder metastatic disease?**

A:

- Assess for ECOG-Performance status. PS- 0,1,2,
- GFR
- Comorbidities

Stratification according to EORTC trial, European organization for Research & treatment of cancer.

**Q: what are the three fitness groups (EORTC-group)?**

A:

1. Fit for cisplatin based combo – chemo  
ECOG 0-1; GFR>60  
Chemo Advised → G.C, m-VAC, HD-MVAC
2. Unfit for cisplatin based combo - chemo  
ECOG 2 GFR< 60 ml /min  
Chemo advised: Gemcitabine + carboplatin  
M-V.A.Carbo
3. Not fit for any combo chemo  
Only single drug agent chemo therapy  
ECOG > 2, GFR < 30

**Q: what is the outcome after Rad Cx?**

A:

Stage I -80%	} 5 yr survival
Stage II -70%	
Stage III- 40%	
Stage IV-30%	

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the factors required for bladder preservation?**

A:

1. Clinical stage – organ confined
2. Pt motivated / ready for fl/up
3. Tumour < 3 cm
4. Unifocal
5. No HN
6. RFT – normal for giving cisplatin.

**Q: what are the molecular markers in MI-Ca bladder?**

A:

- Cell surface – CA 19-9, CA -125
- Growth factor TGF-  $\beta_1$
- Cytokines IL<sub>6</sub>
- Cell degradation: E-Cadherin
- Cells – CTC
- P53, Rb gene

**Q: what is Karnofsky performance scale?**

A:

- 100 – normal person
- 90- normal with minor symptoms
- 80 – normal with symptoms
- 70 – able to self-care
- 60 – occasional assistance needed
- 50 – frequent assistance needed
- 40 – disable
- 30 – severely disabled
- 20- hospitalized
- 10 – moribund
- 00 – dead

**Q: what is ECOG score?**

A:

- 0 – normal
- 1 – symptomatic but completely ambulatory (0% bed)
- 2 –less than ( <) 50% in bed
- 3 – More than 50% in bed
- 4 – 100% bed bound
- 5 – Dead

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: suppose pt stage is T<sub>2</sub>N<sub>2</sub> or T<sub>2</sub>N<sub>3</sub> , what management will you do?**

A: neo adjuvant chemo + Radical C<sub>x</sub> + adjuvant chemo +/- XBRT

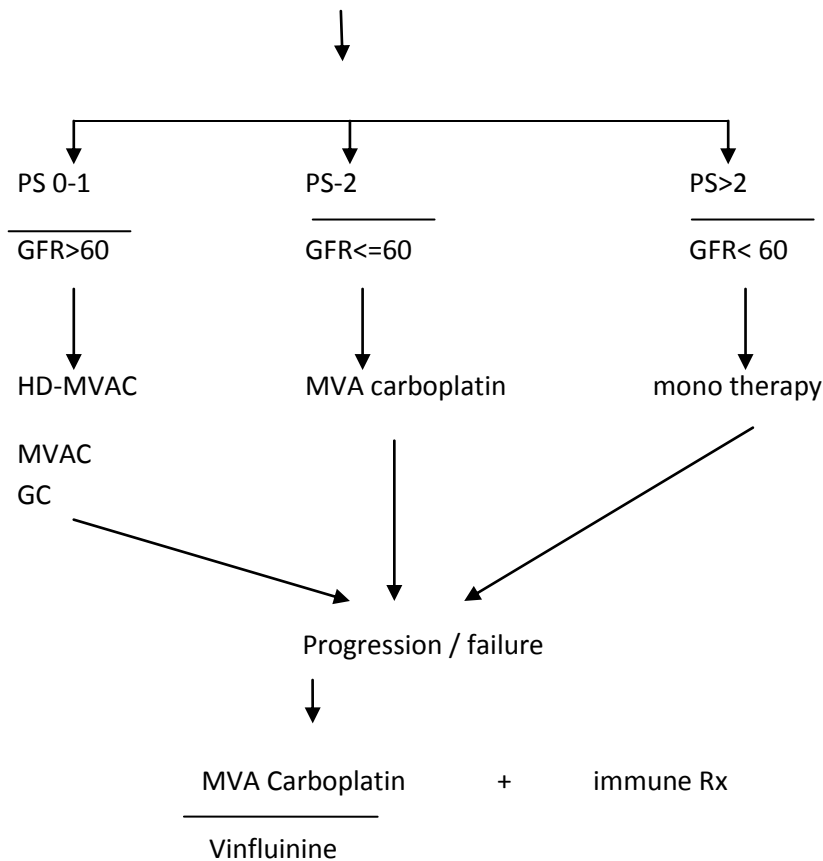
**Q: what management will you do for T<sub>3</sub> N<sub>2</sub>?**

A: Do Ex<sup>m</sup> under anesthesia if bladder is mobile, free from rectum & free from pelvic side walls → Rad C<sub>x</sub> + chemo

If not → Neo adj chemo + Rad Cx

**Q: how will you treat metastatic TCC bladder?**

A: Evaluate Pt – TNM, - sr. Creat, GFR, - ECOG status



**Q: what is Vinflunine?**

A: novel anti –tubular agent

Vincristine → Vinblastin → Vinflunine

**Q: what is HD-MVAC?**

A: same dose MVAC but more frequent MVAC cycles



## Neeraj Sharma's ...Notes For Urology Practicals

**Q: how will you control toxicity of MVAC?**

A: assure GFR > 60

Supplement with GM – CSF

**Q: what immune therapeutic agents can we given for ca bladder?**

A:

Bevacizumab	Sorafenib
Cetuximab	sunitinib
Trastuzumab	Axitinib

**Q: how much is dose of MVAC?**

A:

M- Methotrexate = 30 mg iv stat day 1,8

V -Vinblastin = 1 mg /m<sup>2</sup>

A-Actinomycin = 100 mg/day iv stat. day- 1, 2,3,4,5

C -Cisplatin = 100mg/m<sup>2</sup> IV @ 3 wk

Aid to memory---MVAC--Thirty- one –hundred-hundred = 30-1-100-100

**Q: what are the novel agents for Bladder TCC?**

A: **NOVEL TCC** agents

- N-- Nano-Paclitaxel
- O--oxiplatin
- V--Vinflunine
- E--Estrogen modulator – Tamoxifen
- L--Larotaxel
- T--Trastuzumab
- C--Cetuximab
- C--Cytokine inhibitors.

**Q: how will you fl/up the pt after radical cystectomy for T<sub>2</sub> disease?**

A:

T<sub>2</sub> → PC<sub>3</sub> @ 4 mo x 1 yr  
                  @ 6mo x next 2 yr  
                  @ 12 mo x 5 yr } + yrly CECT for 2 yrs.

**PC<sub>3</sub>** P – Physical examination

C- Common blood parameters → Hb, CBC, RFT, LFT, Ca<sup>++</sup>

C – Cytology

C – CXR.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is Trimodality Protocol?**

A: TURBT → 3 cycles MVAC → 40 Gray XBRT + 2 cycles cisplatin

Check response, if good then give additional 25 gray XBRT + cisplatin.

### **Q: What is the difference b/w palliation v/s salvage surgery?**

A: Palliative: Pain –relief (without cure of underlying cause)

Salvage: saving some sinking ship (with definitive cure of cause)

## **USI- Mock exam cases**

## **Ca Bladder**

55 year Male gross Hematuria + amorphous clots since 5 days, h/o LUTS + dysuria

No h/o loss of wt,

no other +ve of cough, jaundice, bone pain.

TURBT done at local centre: high grade bladder TCC (TURBT)

Ex – smoker 30 yrs

Now also having complains of gross hematuria since 5 days

On exam – NAD

DRE:

- Hard mobile mass felt on left side.& separate from prostate
- Not possible to get above the mass
- Rectal mucosa freely mobile.

### **Q: based on history what can be T-stage?**

A: as it is palpable on DRE; But mobile it should be anywhere around T<sub>2</sub>, T<sub>3</sub>

If mobile = T<sub>3b</sub>

If fixed = T<sub>4</sub>

### **Q: what is the implication of persistent hematuria in this case?**

A: Residual disease (even after attempted TURBT)

### **Q: what will you do next?**

A: USG done... lateral wall bladder mass 4x4 cm, Left kidney HUN +, Rt kidney normal

RFTs – normal

CBC, LFTs

### **Q: why do you want to do USG first?**

A: cheap /available / handy

## **Neeraj Sharma's ...Notes For Urology Practicals**

Lot of information

- Mass
- HUN
- Other kidney

**Q: What is the implication of HUN?**

A:

- Tumour near ureteric orifice
- HUN suggests Muscle invasive disease
- Rarely NMIBC causes HUN

**CECT findings:**

- bladder mass 4x4 cm
- Extension in perivesical space
- No lymphadenopathy

**Q: where will you see for lymphadenopathy in CECT pelvis?**

A: in axial cuts

- Along the external and internal iliac vessels
- Obturator fossa –against the head of femur

**Q: what next will you do?**

A: CXR-PA

**Q: How will now proceed for this case?**

A: As the mass is extending perivesical involvement ideal Mx is neo adjuvant chemo + cystectomy  
And doing a re-TURBT

**Q: why do you want to do Re – do TURBT?**

A: B'coz this perivesical infiltration on CECT may be artifact due to previous TURBT

Also control of ongoing bleeding can be achieved by TURBT

Inadequate information in 1<sup>st</sup> or TURBT, T–staging not known, Mandatorily → muscle invasion must be documented before radical cystectomy

TURBT findings

- Mass palpable on bimanual exam, freely mobile
- Left U.O not seen
- Resection done
- Mass still palpable after TURBT.

**Q: what is other inference from TURBT?**

A: b'coz mass is still palpable after resection, I think it is T<sub>3B</sub>.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the biopsy report?**

A: TCC malignancy - muscle seen involved, sarcomatoid changes present

**Q: what is the implication of sarcomatoid changes?**

A:

Sarcomatoid changes mean tumour has Epitheloid (carcinoma) elements & sarcomatoid (Mesenchymal) elements in the same cancer.

Poor prognosis

Usually sarcomatoid changes are not related to smoking

These are very highly aggressive tumour.

Major Sarcomatoid elements are

- Leiomyosarcoma & Rhabdomyosarcoma.
- Angio sarcoma
- Osteo sarcoma
- Undifferentiated

**Q: what is the goal of management in sarcomatoid changes?**

A: surgery first,

Premium on negative margins (high local recurrence if margin are not cleared)

Supplement surgery with chemotherapy doxorubicin / cisplatin.

**Q: what are the most common sites of mets?**

A: Lung > Bone > liver

**Q: what will you do in this case?**

A: As there are sarcomatoid changes I would do straight away Radical cystectomy.

**Q: if this tumour would have been pure TCC then what is Mx?**

A: neo adjuvant chemo + radical cystectomy

**Q: what is the status of chemo / chemo-radiation for sarcomatoid changes?**

A: due to very small (1%) incidence

We do not have standard guidelines

If chemo → choose doxorubicin / cisplatin or gemcitabine /cisplatin.

**This pt was treated with neo adj gemcitabine +cisplatin, The repeat CT shows complete response.**

**Q: will you still do radical Cystectomy now, when the tumour has completely resolved (T<sub>0</sub>)?**

A: yes, neoadjuvant chemo should always be followed by radical cystectomy even if there is complete tumour response.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the adv. of neo adjuvant chemotherapy for TCC bladder?**

A: Advantages

- 5% survival benefit
- Better tolerated
- Able to receive full cycles
- Primary tumour evaluated for response which has prognostic significance

Dis adv:

- Delays surgery
- Only 5% benefit

**Q: what are the contra-indn for chemotherapy?**

A:

- GFR < 60 ml/min
- Creat > 2 mg /dl
- Ejection fraction < 45%
- Karnofsky performance score < 70
- Evidence of hearing loss
- Peripheral neuropathy > grade 1.

**Q: when will you do Sx after neo adj chemo?**

A: after 3 wks of last cycle

MVAC -3 cycles or 3 cycles GC

**Q: when will you start adjuvant chemo after Sx?**

A: within 90 days (usually 6-8 wks after Sx)

MVAC four cycles

**Q: what are the famous neo adj chemotherapy trials?**

A: Nordic I, Nordic II, SWOG

**Q: what is the meta-analysis statement for neo adj chemo?**

A: 5 yr overall survival benefit of 5%

**Q: describe the procedure of gemcitabine –cisplatin chemotherapy?**

A:

- Blood test for –CBC, Serum creatinine, platelets.
- a 500 ml infusion of saline for about half an hour supplemented with inj<sup>n</sup> Rantac and Emeset
- Give an infusion 100 ml mannitol as Cisplatin can affect the kidneys and giving saline and mannitol can help prevent any damage.

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Gemcitabine (a colourless fluid) as a drip, which takes about half an hour.
- Gemcitabine 1000 mg/m<sup>2</sup> on days 1 and 8 of a 21-day cycle.
- cisplatin 70 mg/m<sup>2</sup> intravenously on day 2. Give cisplatin (a colourless fluid) as a drip, which takes 1–4 hours
- After the chemotherapy is finished, give more saline through the drip.
- Repeat cycle at 21 days



GEMCITABINE



CISPLATIN

## **Case -Bladder Tumour**

52 / M gross hematuria with amorphous clots, no other complaints

External Genitalia → NAD

DRE- grade -1 benign prostate

D/D –

- Tumour bladder/ upper tract
- RCC
- Stone
- BPH
- TB

Investigations – CBC, RFTs

- USG, KUB → urinary bladder mass on right lateral wall 2x3 cm size ,growth solitary ,broad based.

**Q: would you like to do CT scan or TURBT next?**

**A: TURBT.**

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: will you ask for an obturator block?**

A: No / yes , depends upon anesthetists

**Bimanual examination done- palpable / mobile**

**Tumour excision: complete**

**TURBT → T<sub>1</sub>G<sub>3</sub> → high grade NMIBC**

**CIS +**

**Q: what is the risk stratification in Ca- Bladder?**

A: EORTC risk stratification in Cs Bladder for NMIBC (only)

Based on

- Tumour numbers
- Size of tumour
- Grade of tumour
- Concomitant CIS
- Prior recurrence

Also known as Sylvester calculator of NMIBC

**Q: what are the cellular markers for prediction of prognosis of NMIBC?**

A: P-53, Ki-67, cyclin D<sub>1</sub> , BCl<sub>2</sub>

**Q: What is the chance of understaging this tumour T<sub>1</sub>G<sub>3</sub>?**

A: >20%

**Q: Is he candidate for Re-TURBT**

A: Yes

**Q: what are the chances of long term progression of T<sub>1</sub>G<sub>3</sub>?**

A: 53%

- 40% will progress even with BCG
- 60% will progress without BCG Rx
- 50% of more showing initial complete response will progress later in life.

**Q: suppose the re TURBT suggests that T2 disease, what next?**

A: radical cystectomy with neo bladder

**Q: what is your choice of neo bladder?**

A studer's pouch neo bladder

**Q: what are the compln of orthotopic bladder?**

A:

1. Failure to achieve continence



## **Neeraj Sharma's ...Notes For Urology Practicals**

2. Urinary retn & need for CISC
3. Metabolic complication
4. Urinary leak
5. Pouch necrosis
6. Pouch kinking espl in females

**Q: how will you ensure that neobladder and reaches urethra in obese?**

A: Deep mesenteric cut

A vessel proximal to Riolan arch (Drummond's arch) may be transected.

**Q: what is Padua Bladder?**

A: 40 cm ileal neobladder with a comma shaped bending and re-organizing to close in spherical form with abol-eneim-ghoneim ureteric anastomosis.

**Q: what are the ideal characteristics of neobladder?**

A:

- Volume = 400 ml
- Storage pressure < 30 cm H<sub>2</sub>O
- No reflux
- Continent
- Complete voiding

**Q: how will you fl/up superficial NMIBC?**

A:

**Low risk= TaG<sub>1</sub>**

- Cystoscopy @ 3mo following initial resection
- Annually beginning 9 mo after initial Yearly x 5 yr
- cytology , ± tumour markers, + usg if hematuria
- Consider cessation at 5 or more yr

**Intermediate Risk Recurrent T<sub>a</sub>G<sub>2</sub>, T<sub>a</sub>G<sub>1</sub>, Multiple T<sub>a</sub>G<sub>1</sub>**

Check cystoscopy

- @ 3 mo x 2yr
- @ 6 mo x next 2 yr
- @ 12 mo x for next 5 yr

Restart clock if tumour recurs

USG if hematuria

Cytology every time

**High Risk --T<sub>1</sub>G<sub>3</sub>, CIS, T<sub>a</sub>G<sub>3</sub>**

Check cystoscopy

- @ 3 mo x 2 yr
- @ 6 mo x 2 yr
- Annually lifelong

USG ,cytology or tumour markers on each visit

CECT every 2 years and then prolong the interval

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the latest neo adj trial?**

**A: INT – 0080 , Randomized Phase III Trial of Neoadjuvant MVAC + Cystectomy Versus Cystectomy Alone in Patients With Locally Advanced Bladder Cancer**

**Results:**

- There was no difference in the post-cystectomy complication rates
- 5 yr overall survival was 57% v/s 42% favoring the MVAC arm
- Patients with a pathologic complete response had an overall survival of 85% at 5 years

**Authors' Conclusions**

- MVAC is safe prior to radical cystectomy, although toxicity can be moderately severe
- MVAC does not decrease the chances of a patient having a radical cystectomy
- This is the first randomized trial to show both a clinically and statistically significant advantage to the addition of neoadjuvant chemotherapy in locally advanced bladder cancer
- Neoadjuvant MVAC can be offered as a treatment option

**Q: who made MVAC Regimen?**

**A: MSKCC**

**Q: what is the most common side effect of cisplatin ?**

**A:**

1. Nephrotoxicity
2. Vomiting

**Q: what can you give to prevent & treat vomiting?**

**A: Antiemetic → emeset (ondansetron)**

Aprepitant (brand name: Emend) is an antiemetic chemical compound that belongs to a class of drugs called substance P antagonists (SPA). It mediates its effect by blocking the neurokinin 1 (NK<sub>1</sub>) receptor.

**Q: what % of pts progress from NMI → MI ?**

**A: 20% even after Px**

**Q: what is the cause of death in Muscle Invasive Tumour (MIBC)?**

**A: distant mets**

**Q: after Rad Cx or Rad Px in what time mets appear?**

**A: 2 year without systematic chemo**

**→ 5 yr with systemic chemo**

**Q: what para-neoplastic syndromes can occur in P-NET?**

**A:**

- ACTH
- Hypercalcemia
- Hypophosphatemia
- HTN

**Q: how will you treat P-Net?**

**A: Neo Adj Chemo (Cisplatin /Etoposide) → Surgery→ adj chemotherapy**

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***Neeraj Sharma's-***  
**NOTES FOR UROLOGY PRACTICALS**

***Ca Prostate***

***Chapter editor...***

***Dr.Narsimhan Ragawan***

Case-1...

70 yrs /m admitted with complaints of urinary frequency, poor urinary stream since 1 year.

ODP: the patient was symptomatic before 1 yr when he gradually started noticing that the stream of urine decrease slow, initially it used to fall away and now it is falling quite near.

- H/O day time frequency - 10 times, night frequency @ 4 times
- h/o mild, occasional urgency
- h/o nocturia @ 3-4 times
- poor stream ++
- Intermittency –
- Sense of incomplete void +
- Straining to urine +

c/o left shoulder pain x 4 weeks

h/o dysuria = 1 yr back, taken Rx from local physician, who advised him some blood tests & consequently subjected him to a trans rectal procedure reports not available

No h/o Hematuria

No h/o lithuria

No h/o fever, dysuria , no loss of weight

Past h/o-- DM 8 yr / No HTN / no TB

Past surgical Sx history - two younger brothers expired of the ca=prostate at the age – 65 yr, age -67yr

Personal h/o : NAD; retired professor

Drug H/o –

- oral tab for DM
- 1 oral tablet for present symptoms of prostate
- 1 s/c inj. Once only in abd 1 month back

Gen: Patient is oriented to TPP

- T- normal
- P - 80/ min
- BP – 110 /84 mmHg
- RS/CVS – clear

## **Neeraj Sharma's ...Notes For Urology Practicals**

No pallor, no cyanosis, no clubbing No generalized lymphadenopathy

Abdominal examination: PA- soft/ no Mass/ bladder empty

Local examination

- Penis – normal,
- Glans – Normal
- Meatus Normal
- Shaft Normal
- Scrotum: Skin normal
- Left testis , normal in size, shape, configuration
- Right testis ; hydrocele+
- Groins : left hernia Surgery scar

D R Examination:

- Peri anal skin – normal
  - Anal tone normal
  - Rectal mucosa: no growth, free.
  - Prostate : grade II enlarged prostate , mucosa free, mobile consistency firm median sulcus palpable
- Left lobe normal: uniform consistency in whole lobe  
Right lobe: hard nodule felt at the base of the prostate.

**Ca P; general etio-pathology**

**Q: what is the usual age of the presentation of ca prostate?**

A: old age 65% of patients are diagnosed at the age around 65 yrs  
Less than 50 yr rare

**Q: what races are most commonly affected?**

A: whites.  
African – American

**Q: what is the usual stage at diagnosis?**

A: local, organ confined.

**Q: what is familial cancer?**

A: cancer in a man with more than one affected relative

**Q: what is hereditary Ca-penis?**

A:

- subject of familial form
- nuclear families with more than three affected members
- prostate cancer in three successive generations
- two affected individuals diagnosed with cancer before the age of 55 yrs

**Q: what is the % of familial Ca Prostate?**

A: sporadic 85%  
Familial / hereditary = 15%

**Q: what are the genes involved on hereditary ca prostates?**

A:

- BRCA – 1, BRCA-1 on chromosome-17 with 2 times more risk.
- BRCA- 2, BRCA-2 on chromosome-13 with 7times more risk
- HPC-1, HPC -2,

**Q: which virus is associated with Ca prostate?**

A: XMRV Xenotropic murine leukemia related virus

**Q: what is the m/c gene abnormal related to sporadic Ca- penis?**

A: TMPR ss-2 – ETS fusion

**Q: what is the risk to the pt in familial cases?**

A:

Affected	Risk
None	1
Father	2.2
Brother	3.3
1 <sup>o</sup> two member	5.5

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the difference in clinical course of a familial Ca P v/s sporadic Ca P?**

A:

- early age of onset (10 yr difference)
- more aggressive,
- more mortality
- Multifocal within the prostate gland.

**Q: what is the pathogenesis of Ca-Prostate?**

A: Inf<sup>n</sup>, infl<sup>m</sup>, genetic susceptibility → pre cancerous proliferative PIA/PIN → CaP

**Q: what are the other factors / causes for carcinoma prostate?**

A: Proven factors-

1. age – old age
2. ethnicity – white race has increase risk
3. hereditary

Other contributory factors-

1. Smoking – cadmium exposure / O<sub>2</sub><sup>-</sup> stress
2. Diet : fruits / vegetables preventive
3. Dietary fat: high fatty diet & more risk
4. Obesity : slightly more

**Q: what is chemo – prevention?**

A: Modifying the oxidative stress/ androgen pathway - to prevent ca Prostate is known as chemoprevention.

**Q: what are the elements / substrates that can be used for chemo prevention?**

A;

- Lycopene, selenium, vit E , soy, green tea  
SELECT trial – placebo/selenium/vit E/both.....result no difference in any substrate
- Finastride (5-alpha-reductase inhibitor)
- Cholestatin (Cholesterol lowering drugs)

**Q: what is PCPT trial?**

A: PCPT trial started 1993 to 1997 enrolled 19,000 men age >55 years, good health PSA < 3 ng/dl

All patients were subjected to prostate biopsy at the end of study.

Based on the hypothesis that -Finastride blocks 5-alpha- reductase → so decrease DHT → decrease CaP

Results : 25% decrease in risk reduction

-more of high degree CaP (**this interpretation was later changed**)

–

- no PSA value is SAFE

**Q: what are the revised results and interpretations of PCPT trial?**

A:

*The Prostate Cancer Prevention Trial (PCPT) demonstrated that finasteride therapy significantly reduced the risk of prostate cancer by 24.8% ( p < 0.001) compared with placebo. Controversially, there was an increased incidence of high-grade (Gleason score 7) tumours in the finasteride arm compared with placebo. The increase in incidence of high-grade disease observed in finasteride-treated subjects does not appear to be a histopathological effect. A number of potential biases have been identified, including increased detection rate due to prostate volume reduction and improved prostate-specific antigen*



## **Neeraj Sharma's ...Notes For Urology Practicals**

*specificity and sensitivity for detecting prostate cancer. This would suggest that there was an improved detection of overall prostate cancer as well as high-grade prostate cancer in men treated with finasteride, rather than an increase in risk compared with placebo. Further analyses of the data from the PCPT together with other clinical findings strongly suggest that the increase in high-grade tumours in the finasteride arm is an artifact*

Please read: The PCPT: New Findings, New Insights, and Clinical Implications for the Prevention of Prostate Cancer Bulent Akduman, E. David Crawford  
European urology supplements 5 ( 2006 ) 634–63

### **Q: what is PIN ?**

A;

- prostatic intra epithelial neoplasia
- previously subclassified as low grade and high grade PIN , now only HGPIN is applicable
- PIN = HGPIN only
- Incidence 5%
- 26% chances of repeat biopsy coming as positive for Ca prostate

### **Q: what are the implications of PIN?**

A:

- finding PIN in one of the biopsy cores : repeat biopsy within a year is not required
- Findings PIN in two or more cores: repeat biopsy within a year
- 26% chances of findings CaP in 2<sup>nd</sup> biopsy
- Repeat biopsy should sample the whole prostate (& not just the area of PIN)

### **Q: what are the methods of spread for CaP?**

A:

- Direct
- Lympho vascular

### **Q: what are the organs involved in mets?**

A:

1. Lymph nodes, bones, lung, Virchow's LN
2. Liver, bladder, adrenal.

### **Q: what is TINT?**

A: Tumour indicating non-malignant tissue.

This is based on the fact that there are subtle changes in the nearby normal tissue which is abutting the malignant tissue. Finding these subtle changes in a non malignant tissue can indicate an impending malignant transformation. This yet non-malignant tissue is called TINT.

PDGFR is measured

### **Q: what is ASAP?**

A: Atypical small acinar proliferation

- Atypical focus suspicious but not diagnostic of Carcinoma
- Incidence 5%
- 40% chances of getting malignancy in repeat biopsy

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Tumour Node Metastasis (TNM) classification of PCa\***

#### **T - Primary tumour**

TX Primary tumour cannot be assessed

T0 No evidence of primary tumour

T1 Clinically inapparent tumour not palpable or visible by imaging

T1a Tumour incidental histological finding in 5% or less of tissue resected

T1b Tumour incidental histological finding in more than 5% of tissue resected

T1c Tumour identified by needle biopsy (e.g. because of elevated prostate-specific antigen [PSA] level)

T2 Tumour confined within the prostate

T2a Tumour involves one half of one lobe or less

T2b Tumour involves more than half of one lobe, but not both lobes

T2c Tumour involves both lobes

T3 Tumour extends through the prostatic capsule

T3a Extra capsular extension (unilateral or bilateral) including microscopic bladder neck involvement

T3b Tumour invades seminal vesicle(s)

T4 Tumour is fixed or invades adjacent structures other than seminal vesicles: external sphincter, rectum, levator muscles, and/or pelvic wall

#### **N - Regional lymph nodes**

NX Regional lymph nodes cannot be assessed

N0 No regional lymph node metastasis

N1 Regional lymph node metastasis

#### **M - Distant metastasis**

MX Distant metastasis cannot be assessed

M0 No distant metastasis

M1 Distant metastasis

M1a Non-regional lymph node(s)

M1b Bone(s)

M1c Other site(s)

Tumour found in one or both lobes by needle biopsy, but not palpable or visible by imaging, is classified as T1c.

Invasion into the prostatic apex, or into (but not beyond) the prostate capsule, is not classified as pT3, but as pT2.

Metastasis no larger than 0.2 cm can be designated pN1 mi.

When more than one site of metastasis is present, the most advanced category should be used

---

**Gleason's scoring**

**Q: what is a Gleason score?**

A: Gleason's score is a grading system to grade glandular architectural disarray in prostatic gland as seen under low power microscopy.

**Q : what is the stain used for Gleason's scoring?**

A; H & E

**Q: what is the lens power used for Gleason's scoring?**

A: low power 10 x

**Q: what does Gleason's score depict cellular morphology or glandular architectural?**

A: Gleason's score depict glandular architectural disarray.

**Q: what are Gleason's patterns?**

A: Gleason patterns are associated with the following features:

- Pattern 1 - The cancerous prostate closely resembles normal prostate tissue. The glands are small, well-formed, and closely packed. This corresponds to a well differentiated carcinoma.
- Pattern 2 - The tissue still has well-formed glands, but they are larger and have more tissue between them, implying that the stroma has increased. This also corresponds to a moderately differentiated carcinoma.
- Pattern 3 - The tissue still has recognizable glands, but the cells are darker. At high magnification, some of these cells have left the glands and are beginning to invade the surrounding tissue or having an infiltrative pattern. This corresponds to a moderately differentiated carcinoma.
- Pattern 4 - The tissue has few recognizable glands. Many cells are invading the surrounding tissue in neoplastic clumps. This corresponds to a poorly differentiated carcinoma.
- Pattern 5 - The tissue does not have any or only a few recognizable glands. There are often just sheets of cells throughout the surrounding tissue. This corresponds to an anaplastic carcinoma.

In the present form of the Gleason system, prostate cancer of Gleason patterns 1 and 2 are rarely seen. Gleason pattern 3 is by far the most common.

**Q: what are the primary, secondary and tertiary grades in Gleason's scoring?**

A:

- Primary grade - assigned to the dominant pattern of the tumor
- Secondary grade - assigned to the next-most frequent pattern
- Tertiary grade - most aggressive pattern.(if different from primary and secondary)

**Q: why is Gleason's score two numbers?**

A: Gleason's score represents the most common pattern & next m/c pattern in a prostatectomy  
Primary pattern, secondary pattern → both are influential in spectrum

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the difference in Gleason's scoring of Radical prostatectomy specimen v/s biopsy specimen?**

A: Radical Px → Primary grade (most common) + secondary grade (2<sup>nd</sup> most common)

Biopsy → Primary grade (most common) + highest grade (irrespective of the fact that whether it is next most common or not )

**Q: why do you submit biopsy in separate jars?**

A:

- In atypical cases → repeat biopsy can be targeted to the previous known locations
- More specific locations help in – nerve preserving protocol, better brachy /cryo therapy

**Q: what are the rough outcomes of repeat biopsy in various situations?**

A:

Diagnosis at 1 <sup>st</sup> biopsy	Repeat biopsy diagnosis as CaP
BPH	20%
HGPIN	30% (26 to 30 %)
ASAP	40%

**Q: when will you do repeat biopsy?**

A: within 6 months (usually 3-4 months)

**Q: what are the types of Carcinoma of prostate?**

A:

- Adenocarcinomas
- Urothelial Carcinoma
- Mesenchymal tumours – Rhabdomyosarcoma
  - Leiomyosarcoma
  - Spindle cell ca

**Q: what are the TRUS probes?**

A:

- high freq – 7 MHz → near evaluation ( Low frequency – 4 MHz → far evaluation)
- End firing & side firing probes

**Q: what are indications for TRUS in general?**

A:

1. Evaluation of Azoospermia
2. Prostate related
  - volume measurement
  - Brachytherapy planning
  - Marker placement
3. Biopsy

**Q: what are the indn for TRUS biopsy?**

A:

Suspected for Ca – prostate

- P.S.A. increase
- DRE findings
- Symptoms like bone pain
- Family history of ca prostate

Prior to Management of ca –bladder (prostate sparing)

Follow up biopsy

- HGPIN, ASAP
- Post radiation rising PSA
- Post cryotherapy rising PSA

**Q: what are the contra-indications for TRUS biopsy?**

A:

- uncorrectable Coagulopathy
- UTI
- Prostatitis
- Painful anal Conditions

Always give Fluroquinilone oral+ 1 gm 3<sup>rd</sup> generation cephalosporin before biopsy

**Q: in which conditions will you opt for Transperineal biopsies?**

A:

- painful anal cond<sup>n</sup>
- anal spasm, fissure
- Post APR surgery

**Q: what type of Biopsy and how many cores will you take?**

A: 12 core, trus biopsy (Gold std)

The sample sites should be as lateral and posterior as possible

Additional cores should be obtained from suspected areas on DRE.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the complications of TRUS biopsy?**

A:

- Hematuria (20%),
- Hematospermia (40%),
- rectal bleeding
- infection-Prostatitis UTI, Sepsis
- Urinary ret<sup>n</sup> (1%)

**Q: how does Ca-P look in TRUS?**

A: Hypoechoic area

**Q: what are the chances of a malignant area being Hypoechoic?**

A:

- 57% malignancies are Hypoechoic
- 40% are isoechoic;
- 1-3% hyperechoic.

**Q: what is the D/d of a hypoechoic lesion on TRUS?**

A:

- Granulomatous Prostatitis
- Lymphoma
- Prostatic infarct
- BPH nodules

**Q: what else can you see in TRUS?**

A

- Prostatic cysts
- Mullerian duct cysts(midline)
- Seminal vesicle cysts
- Ejaculatory duct cyst

**Q: What are the advances in TRUS?**

A:

- TRUS – Doppler
- Amplitude shift TRUS
- Flash replenishment TRUS
- Microbubble contrast TRUS
- TRUS Elastography
- TRUS Histoscan

**Q: what is saturation biopsy?**

A:

- atleast 22 core TRUS biopsy ;
- 33-44% chances of getting +ve for ca prostate
- The best way to obtain a saturation biopsy is Transperineal route

## Neeraj Sharma's ...Notes For Urology Practicals

**Q: what is transitional zone index (TZI )& what it predicts?**

A:

- $TZI = TZ \text{ volume} / \text{Prostate volume in TRUS}$
- Note that TZ is BPH zone and PZ is Ca- Prostate zone

TZI predicts -

- Chances of AUR in BPH
- need for TURP in BPH

**Q: what is Histoscan?**

A: . It is USG based tissue characterization Technique developed to identify & characterize different type or prostate tissue based on the backscattered ultrasound and with the help of computer software –  
--Histo → Histological diagnosis, - scan based (USG)

**Q: what is **Vienna nomogram**?**

A:

- Also known as **Bob Djavan criteria**
- Vienna nomogram is a function of gland size v/s age of the patient and then depicts the number of biopsy cores required to give positive prediction value of > 90%.
- The Vienna nomogram offers an easy tool to select the optimal number of prostate biopsy cores based on patient age and total prostate volume in PSA range 2 to 10 ng/ml. Cancer detection is significantly improved (66.4%) compared to the control group.
- Please read... J Urol. 2005 Oct .**The Vienna nomogram: validation of a novel biopsy strategy defining the optimal number of cores based on patient age and total prostate volume.**  
Remzi M<sup>1</sup>, Fong YK, Djavan B.

Prostate volume (mL)	Age (y)			
	< 50	51-60	61-70	> 70
0-30	8	8	8	6
31-40	12	10	8	6
41-50	14	12	10	8
51-60	16	14	12	10
61-70	18	16	14	12
> 70	18	18	16	14

**Q: what is Elastography?**

A:

- Elastography is an imaging technique that images the elasticity or stiffness of the tissues.
- It is based on the fact that the malignant tissue is less elastic than normal tissue
- Ultrasound waves are reflected differently according to the elasticity of the tissue
- Interpreting these reflected waves can give an idea about less elastic tissue zones v/s more elastic tissue zones.
- Less elastic tissue zones are then biopsied to establish the diagnosis of malignancy.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what are the colour codes used for Elastography?**

A: by convention green colour depicts normal tissue and blue colour depicts abnormal / malignant tissue.

### **Q : what are the types of Elastography techniques?**

A: Two elastography techniques have been developed based on different principles:

- quasi-static (or strain) technique, and
- shear wave technique.
- Please read... Diagnostic and Interventional Imaging Volume 94, Issue 5, May 2013, Pages 551-560 ..Ultrasound Elastography.

### **Q: what is PSA-TZ?**

A: PSA measured/TZ volume = cut off = 1.26 ng/ml/cc

### **Q: what is size of TRUS biopsy needle?**

A: 2 cm

### **Q: what are the ind<sup>n</sup> for repeat biopsy?**

A:

1. Suspected DRET Trus normal
2. Rising PSA
3. Extensive PIM (localized HGPIIM is not an indn)
4. ASAP

### **Q: which aspects should pathologist specifically comment upon in biopsy report?**

A: Type of Ca

- Gleason's primary + secondary
- Total no of cores +ve
- % of cores +ve

### **Q: when can you not do nerve sparing prostatectomy?**

A:

- >33% of cores ipsilaterally involved
- >50% per core.



**Q: what is PSA?**

A: Prostate specific antigen → kallikrein like serine protease produced by epithelial cells of prostate gland. Human kallikrein-3 (KLK3)

**Q: what is the function of P.S.A?**

A: The function of PSA is to liquefy semen through its action on the gel-forming proteins semenogelin and fibronectin within the semen following ejaculation

**Q: who discovered P.S.A?**

A: ABLIN

- P- Pepsidaro
- S- Stamey
- A-Ablin

**Q: who establish PSA as tumour markers?**

A: stamey & Pepsidaro

**Q: what is the significance of PSA values?**

A:	PSA	% chances of CaP
	0-0.5	5%
	0.5 – 1.0	10%
	1-2	20%
	2-3	30%
	3-4	40%

**Q : can there be prostatic cancer without rise of PSA (normal PSA values)?**

A:yes, in cases of highly undifferentiated Adenocarcinomas or non-Adenocarcinomas of prostate.

**Q; what is the current status of DRE?**

A: Detects tumour  $\geq 0.2$  ml

20% of CaP detected by DRE

Specification, Sensitivity → around 30%

**Q: what is the m/c used method to detect CaP**

A: Use DRE + PSA = both together

Specificity 60%

**Q: what is grey zone P.S.A.?**

A: P.S.A value of 4-10 ng/ml is called grey zone.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what will do for grey zone PSA?**

A:

- Free PSA (p.s.a. molecule that is not bound to any other proteins)
- Free PSA (pneumonic--free of cancer)
- Decrease in free PSA means increase chances of CaP
- Values below 0.15 are significant

**Q: how does a free PSA value dictate the management?**

A:

- $>0.25 \rightarrow$  no need to biopsy
- $0.25 - 0.15 \rightarrow$  consider biopsy
- $<0.15 \rightarrow$  do biopsy

**Q: which molecules bind to PSA?**

A: complexed PSA (c PSA) is bound to either  $\alpha_2$ -macroglobulin (AMG) or  $\alpha_1$ -antichymotrypsin (ACT).

**Q: which of the two forms of bound PSA is measurable?**

A:

- When serum PSA is bound to ACT, 2 epitopes are left unmasked and can be detected with immunoassays.
- The complex formed with AMG is enveloped by this proteinase inhibitor so that no epitopes are left exposed for detection, and this lack of antibody attachment sites makes the PSA-AMG complex difficult to measure.

**Q: what is PSA velocity?**

A:  $> 0.75$  ng/ml/yr is significant

- $\rightarrow$  Current status of PSAV is useless
- $\rightarrow$  PSADT (doubling time) is more relevant in fl/up ca-prostate cases  
Using Freeland's criteria & Pound's criteria

**Q: what is PSA density?**

A: PSA value per gram size of prostate.

**Q: what is normal value for PSA density?**

A: nearly 0.15 ng/ml/gm

**Q: what is the T-half life of PSA?**

A: 2-3 days

**Q: when will PSA come back to Baseline after biopsy?**

A: - post Biopsy  $\rightarrow$  around 4 weeks

Ejaculation/ catheterization / DRE  $\rightarrow$  48 hrs  $\rightarrow$  usually the change in PSA is clinically insignificant

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the D/d s of increased PSA?**

A:

- Ca Prostate
- Prostatitis
- BPH
- Biopsy
- Ejaculation
- DRE
- catheterization/ AUR

**Q: what is the percentage reduction in PSA with Finasteride?**

A: 50% reduction in 6 months

**Q: what is the only indn of doing free PSA?**

A: Normal DRE + PSA values in the range of 4-10 ng/ml

**Q: does Finasteride affect free PSA/total PSA ratio?**

A: Both free PSA & total PSA declines with Finasteride, so the ratio remains unaltered.(Campbell P- 2754)

**Q: what is Pro PSA?**

A: Uncleaved PSA is Pro PSA .(- 7 amino acid precursor + PSA.)

**Q: what is (-2)<sub>p</sub> PSA?**

A: PSA isomers due to cleaving done at abnormal position of <sub>p</sub>PSA  
- Increase in (-2)<sub>p</sub> PSA values are directly related to Ca Prostate

**Q: what is PCA-3?**

A:

- PCA-3 is a Urine marker
- Prostate cancer antigen -3
- Prostate specific "non coding" mRNA marker
- Ca-Prostate specific
- Not affected by Prostatitis / BPH / size of prostate
- Used for patients with raised PSA with negative biopsies

**Q: what sample is required for PCA-3?**

A; Urine (after prostatic massage) → centrifuge → use sediment

**Q: how do you interpret PCA-3**

A: PCA-3 score = PCA-3mRNA

$$\frac{\text{PCA-3 mRNA}}{\text{PSA - mRNA}} \times 1000$$

- Higher the score / higher the chance
- Higher sensitivity & specificity.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the indication for doing PCA-3?**

A; Elevated PSA with Normal (negative) biopsy

**Q: what is the status of PCA-3 as marker?**

A; FDA approved "ProgenSA"

- Please read <http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DeviceApprovalsandClearances/Recently-ApprovedDevices/ucm294907.htm>
- **Approval Date:** 02/13/2012

**What is it?** The PROGENSA® PCA3 Assay is an automated molecular test (assay) that helps physicians determine the need for repeat prostate biopsies in men who have had a previous negative biopsy.

**How does it work?**

- Do a digital rectal exam (DRE) and immediately afterwards the patient collects a 20-30 mL first catch urine. The DRE releases prostate cells in the first catch urine. The urologist's office processes the urine and sends the specimen to a laboratory for testing.
- At the testing laboratory, a trained medical professional measures the prostate specific antigen (PSA) ribonucleic acid (RNA) and prostate cancer gene 3 (PCA3) RNA molecules and calculates the PCA3 Score (a ratio of PCA3 RNA to PSA RNA).
- The urologist reviews the results together with other patient information. A negative PCA3 score helps the urologist determine whether a repeat biopsy is not required.
- If the test PCA3 Score is negative, then there is less likelihood of a positive biopsy at the repeat biopsy.

**When is it used?** This test is used in men 50 years of age or older who have had one or more previous negative prostate biopsies and for whom a repeat biopsy would be recommended by a urologist based on current standard of care, before considering the use of the PROGENSA® PCA3 Assay.

**What will it accomplish?** This test helps to determine if a repeat biopsy would not be required when used with other clinical information and laboratory tests in patients with previously negative prostate biopsies; and for whom a repeat biopsy would be recommended. As a result, some patients who would otherwise be recommended for a biopsy may be saved from unnecessary biopsies and related complications.

- **When should it not be used?** The test should not be used for men with atypical small acinar proliferation (ASAP) on their most recent biopsy.

**Q: what is PSMA?**

A:

- Prostate specific membrane antigen
- Trans membrane protein
- PSM is the spliced variant which represents normal tissue
- PSMA/PSM ratio is used
- – 5-10 - ca- prostate

## **Neeraj Sharma's ...Notes For Urology Practicals**

-0.75 – 1.50 – BPH  
-0.05 – 0.50 normal

### **Q: what is the ind<sup>n</sup> for PSMA?**

A: increased PSA with normal Biopsy

### **Q: what is ProstaScint?**

A:

Indium In 111 capromab pendetide (ProstaScint), also known as CYT-356, is a labeled monoclonal antibody that recognizes a specific membrane antigen on prostatic carcinoma cells.

ProstaScint is based on the discovery of this attached antibody to a prostate specific protein called prostate-specific membrane antigen (PSMA), which is a relatively new tumor marker for prostate cancer. Unlike PSA, the expression of PSMA is increased primarily in poorly differentiated and metastatic tumors.

ProstaScint, a nuclear medicine scan, is a two part study that involves an I.V. injection with the combination of Indium In111, a radioisotope and ProstaScint, on ProstaScint in the first visit. When this combination is given, the antibody attaches itself to sites of prostate specific membrane antigen (PSMA). The patient is then scanned on day 4 with a gamma camera to view the areas that have large amounts of the antibody. The imaging takes approximately 3 hours and includes a full body scan, a pelvic SPECT scan, and an MRI of the pelvis.

### **Q: can ProstaScint be used as screening test in general population?**

A: ProstaScint is not a screening test for the general population.

### **Q: what are the indications for doing ProstaScint?**

#### **A: *Current Policy Statement***

Health Net, Inc. considers ProstaScint (Indium-111 labeled capromab pendetide) medically necessary, specifically, for either of the following scenarios:

- 1). As a diagnostic imaging agent in newly diagnosed patients with biopsy-proven prostate cancer thought to be clinically localized after standard diagnostic evaluation (e.g., chest radiograph, bone scan, computed tomography [CT] scan, or magnetic resonance imaging [MRI]), who are at high risk\*for pelvic lymph node metastases; or
- 2.) As a diagnostic imaging agent in patients with a rising prostate-specific antigen (PSA) following definitive local therapy (eg. Post radiation therapy, or radical prostatectomy, etc.).

### **Q: what is the FDA approval status of ProstaScint?**

A: ProstaScint received U.S. Food and Drug Administration (FDA) approval on October 28, 1996 for use as an imaging agent

- (1) For the staging of newly diagnosed patients with biopsy-proven prostate cancer who are at a high risk for soft tissue metastases
- (2) For the restaging of post prostatectomy patients with a rising PSA level.

### **Q: what are the other markers?**

A:

- GSTP1
- TMPRSS-2-ETS fusion
- RASS FIA
- Micro – RNA

**Q: what are the types of screening?**

A:

- Generalized screening (which is done in mass population)
- Opportunistic screening (which is done in patient presented to hospital due to related disease)
- Personalized screening (for high risk patients)

**Q: what are the General indications for screening?**

A:

- age > 50 yr, < 75 yr {age > 40 yr for +ve family history}
- Life expectancy ≥ 10 yrs

**Q: what is the present guideline statement for generalized screening?**

A:

- generalized screening is usually not required
- Only opportunistic screening is recommended
- Baseline PSA should be done at the age of 40 years (PSA @ 40 yr) and then 8 yearly
- No PSA for pt > 75 yr

**Q: what will you calculate life expectancy?**

A: **Charlson's comorbidity index**

- Predicts the 10 yr mortality in a patient of any disease by calculating comorbidities
- Scoring 1, 2, 3, or 6
- 1 - MI
- 2 - hemiplegia, CKD, Tumour localized
- 3 - Liver disease
- 6 - AIDs, Tumour metastasis

**Q: what are the famous screening trials?**

A: PLCO, ERSPC & Goteborg

ERSPC → European Randomized study for Screening Prostate Cancer

PLCO → Prostate Lung Colorectal Ovarian study

Initial results → no advantage of screening @ 7 yrs

Late results → 44% less disease specific death (DSD) rates in screened pts

GOTEBORG → young population study (50 – 64)

44% decrease in advance disease presentation due to screening.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: describe ERSPC- European Randomized study for Screening Prostate Cancer?**

A: The ERSPC is the largest randomized trial of screening for prostate cancer with 162,388 men and 900 prostate cancer deaths. Screening is based on regular prostate-specific antigen (PSA) testing every 2-4 years in the intervention arm and usual care with no screening offered in the control arm.

#### European Randomized Study of Screening for Prostate Cancer (ERSPC) Results

Study Participants	Cancer Incidence	Cancer Mortality		
Total, age 55–69 years	162,243	10,297		
Screening group	72,890 (44.9%)	5990 (8.2%)	214	0.80*
Control group	89,353 (55.1%)	4307 (4.8%)	326	

\*95% confidence interval, 0.67–0.95;  $P = .01$ .

Data from Schroder FH et al.

- In other words, to prevent 1 death from prostate cancer, 1410 men need to be screened and 48 men treated.
- It was additionally suggested that the population that benefited from screening was restricted to men between the ages of 55 to 69 years, and that other age groups did not show a reduction in mortality through screening.

Please read **Screening for Prostate Cancer: A Review of the ERSPC and PLCO Trials**

Elisabeth Eckersberger, MPA, @ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2777060/>

### **Q: describe PLCO?**

A: In the PLCO trial, 76,693 men at 10 US study centers were included. The screening group consisted of 38,343 men and the control group consisted of 38,350 men. Randomization was done within blocks of the population stratified according to center, age, and sex. Men in the screening group received annual PSA screenings, whereas those in the control group were not actively screened but sometimes received screening outside of the study, resulting in a contaminated population

These results show that, after an average 7 years of follow-up, the mortality did not significantly differ between the 2 groups. Therefore, in this study, screening was not associated with mortality .

### **Q: what is the present status of population based PSA screening?**

A: not advisable (EAU – P-13)

### **Q: what is the present status of PSA screening?**

A: - Individualized/opportunistic screening can be offered to a well informed man.

PSA done @ 40 yrs & then 8 yearly

Radical Prostatectomy

### **Q: what % of diagnosed ca prostate pts will die of Ca- Prostate?**

A: 16 – 20%

### **Q: what % of total deaths are due to Ca-Prostate?**

A: 5%

**Q: what is indolent cancer?**

A: Epstein introduced indolent cancer

- Organ confined,
- $< 0.5\text{cm}^3$ ,
- no poorly differentiated elements.

**Q: what is Over diagnosis?**

A: Over diagnosis refers to cancer detected by screening that would not be detected otherwise during pt's life time.

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## **RADICAL PROSTATECTOMY-- Rad Px**

**Q: what are the indn for radical prostatectomy?**

A:

- $T_1 - T_{2b}$  organ confined tumour
- $T_{2c}$  -selected cases
- Life expectancy  $> 10$  yrs.

**Q: who are the pioneers of radical prostatectomy (Rad Px)?**

A:

- Kuchler 1866
- Young 1905 (perineal)
- Milin's (Retro pubic)

**Q: what is the treatment of choice for localized ca prostate?**

A: for a patient who is young, life expectancy more than 10 years and moderate to high risk localized disease radical prostatectomy is the treatment of choice.

**Q: what is the best modality if choice to perform radical prostatectomy?**

A: robotic if available followed by laparoscopic followed by open radical prostatectomy.

**Q: which group of L.N. will you remove in radical prostatectomy?**

A: pelvic group of L.N. except presacral

(HOPE= Hypogastric, Obturator, Presacral, External iliac.)

Presacral L.N. are not removed

**Q: what will you do if on table frozen section report of L.N. comes positive for malignancy?**

A: initial view was to abandon the procedure but current policy is to continue the surgery and remove prostate. ( According to Engel and bastion study.)



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the famous Engel & Bastian study?**

A: Engel & Bastian E-urol 2010

- Centre:- Munich cancer registry
- Type → retrograde prospective trial
- Time duration – 1988 to 2007
- Methods → 1414 pts were found have N+ve intra-operatively  
→ in 456 Radical Prostatectomy was abandoned  
→ 958 radical Prostatectomy was completed.

Result –

- quality of life scores were better with completed procedures
- BOO, LUTS and Hematuria were less with completed cases

**Q: suppose radical prostatectomy is done for localized ca prostate but pathological L.N. are positive, what will you do next?**

A: ADT should be offered to this patient

**Q: when will you start ADT, immediately or when frank mets occur?**

A: immediately (as per Messing trial)

**Q: what is the famous Messing trial?**

A:

- **Immediate versus deferred androgen deprivation treatment in patients with node-positive prostate cancer after radical prostatectomy and pelvic lymphadenectomy. Messing EM<sup>1</sup> Lancet Oncol. 2006 Jun; 7(6):472-9.**
- Appropriate timing of androgen deprivation treatment (ADT) for prostate cancer is controversial. Aim was to determine whether immediate ADT extends survival in men with node-positive prostate cancer who have undergone radical prostatectomy and pelvic lymphadenectomy compared with those who received ADT only once disease progressed.
- **INTERPRETATION:** Early ADT benefits patients with nodal metastases who have undergone prostatectomy and lymphadenectomy, compared with those who receive deferred treatment. The beneficial effects of early ADT, rather than an imbalance in risk factors, are likely to explain the differences in outcomes between treatments.
- Patients who become pN+ve after radical Prostatectomy should be given ADT within 8 wks (as PSA < 0.1 ng/ml) ADT in this setting improves OS/QOL/DSS.
- Retrospective study done from pts of 1988 – 1993 with fl/up of 11 years

**Q: what will you do for margin positive cases?**

A: do completion EXBRT. along with short course of ADT

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the advantages of Rad Px?**

A:

- Minimal collateral damage
- Excellent tumour control
- Better fl/up, better defined fl/up
- 3-5 day hospital stay.

**Q: what are the dis adv of Rad Px?**

A:

- Hospitalization required
- Operative morbidity & complications
- Fitness for Surgery

**Q: what is Prostatic trifecta?**

A:

- will to survive
- Wish to remain continent
- Wish to be potent (sexually)

**Q: what is Prostatic pentafecta?**

A:

- will to survive
- Wish to remain continent
- Wish to be potent (sexually)
- Free of complications
- Negative surgical margins.

**Q: how will you fl/up a patient after radical Px?**

A:

- PSA+DRE @ 3mo, 6 mo, 12 mo
- Then every 6 mo until 3 yr then annually life long
- The same criteria follow for radiotherapy as primary Px.

**Q: when will you intervene after rad Px?**

A: Ideally psa after radical prostatectomy → undetectable

- PSA of 0.2 ng/ml after Rad Px or rise above 0.2 ng/ml over nadir
- Or palpable nodule in DRE
- Or TRUS +ve for lesion
- Or metastasis detected

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are Partin's tables? What are the variables used in partin tables? What are the outcomes predicted?**

A: Partin tables use clinical variables to predict the stage of tumour, i.e., organ confined or nodal involvement.

Variables used	Outcome measured
1. PSA	organ confined
2. Gleason score	Extra prostatic ext <sup>n</sup>
3. Clinical Stage (T)	S.V involvement
	Nodal involvement

**Q: what are the risk groups/ sub-staging for localized Ca-Prostate?**

A: D' Amico sub-classification

- Low risk →  $cT_1-T_{2A}$ , Gleason's  $\leq 6$ , PSA  $\leq 10$
- Intermediate risk →  $T_{2b}, T_{2c}$  Gleason = 7 PSA in range of 10-20
- High risk →  $T_{3a}$ , Gleason 8-10, PSA > 20

**Q: what comprises low risk localized CaP?**

A:

- $cT_{1A}, cT_{1B}, cT_{1C}, T_2$
- Gleason  $\leq 6$
- PSA  $\leq 10$ .

**Q: How will you manage low risk localized Ca-Prostate?**

A:

$T_{1A}, T_{1B} \rightarrow$  Active surveillance (best)

$T_{1C}, T_{2A} \rightarrow$  radical prostatectomy.

**Q: what are the chances of LN involvement in  $T_{1A}$ , -  $T_{2A}$**

A: Less than 7%

**Q: what is special about radical Px for low risk localized CaP?**

A:

- No need for lymphnode dissection as L.N involvement chances are less than 7%
- MRI pelvis alone is sufficient
- No need for bone scan

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**Watchful waiting and A/S**

**Q: what is watchful waiting w/w?**

A: means no active Rx till symptoms occur= deferred treatment = symptom guided Treatment

**Q: what is the concept behind w/w?**

A:

- CaP is the disease of old age
- Many co-morbidities in the same patient
- CaP is indolent / slow disease
- Local treatment may be incomplete

**Q: what are the criteria for selection for w/w?**

A:

- age > 70 yrs,
- life expectancy < 10 yr
- Any T, Any PSA
- GS< 7 (Well differentiated type on TRUS Biopsy.)

**Q: what is the risk of mets in w/w? Or what are the chances of metastasis in a lifetime of UNTREATED ca Prostate?**

A: as per Chodak Meta-analysis, chances of metastasis in a lifetime of UNTREATED ca Prostate(or patient under w/w) depends upon the histological type

- well differentiated → 20%
- Moderately differentiated → 40%
- Poorly differentiated → 80%

**Q: what are the treatment modalities available once the patient progresses on w/w?**

A: usually such patients have advanced disease and require ADT → Sx / medical / combined  
--> Zolendronate --> ERBT to bones

**Q: what is the Intent behind w/w?**

A: Intent is Palliative

**Q: what is the famous study on w/w?**

A: Scandinavian trial

Outcome was

- 12 % patients of Rad Px died of CaP where as 18% (1.5 times) of w/w died of CaP.
- After 12 yrs , 18% of Rad Px patients & 27% (1.5 times) of w/w patients had mets .
- Result : Rad Px is better.

**Q: what are the m/c operations performed under w/w?**

A:

1. TURP (channel TURP) to relieve obstruction
2. Hormonal management in the form of Orchiectomy for metastasis management
3. EBRT for Bone mets / symptoms

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the famous studies for w/w?**

A;

1. Scandinavian study
2. Chodak meta analysis : the 5 yr & 10 yr disease specific survival and metastasis free survival is related to histological grade of tumour .high grade tumours have least 5 yr / 10 yr DSS & MRS.

**Q: what is Active surveillance?**

A: It is the systematic programmed periodic monitoring to catch the disease process in time & treat it effectively.

Principles: Tumour progresses from origin to clinically detectable stage in 9-10 yrs

QOL can be preserved for 1- yrs.

**Q: what is the Intent behind Active surveillance ?**

A: Intent is cure

**Q: what are the criteria for selection for A/S?**

A:

- Age – 50 – 70 yr (fit for Rad Px)
- Life expectancy > 10 years
- Epstein's criteria..Gleason < 6, PSA < 10, less than 3 cores + ve
- Well informed patient agreeing for strict follow up

**Q:In which pts will you choose A/S as choice of management?**

A: Low risk Pts only with Epstein Criteria

- Organ confined Tumour (size < 0.2 ml)
- Gleason < 6 (no 4, no 5)
- PSA density < 0.15
- PSA velocity < .75
- PSA < 10
- Fewer than 3 cores involved with no core > 50% involved

**Q: what else you will ensure before A/s**

A: Pt is motivated for regular fl/up

Prostate mapping (extended core biopsy) – Transperineal (better) or TRUS guided

**Q: How will you fl/up a patient of A/S?**

A: "(TRUS + DRE) " & PSA @ 3 months for 1 year

@ 6 months for 2<sup>nd</sup> yr onwards

Biopsy = Baseline, then @ 1 yr, then @every 2 yr.

**Q: what is this fl/up criterion known as?**

A: Patel criteria

Uses points -> 1, 2, 3

Pts with 3 pts have progression and should be subjected to radical prostatectomy

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is the risk of mets in w/w?**

A: well differentiated (Gleason 2-4)-- 20%

-Moderately differentiated (Gleason 5-6) --40%

-Poorly differentiated (Gleason 7 & above)-- 80%



@ 10-12 yrs Chodak  
meta analysis.

### **Q: what are Epstein's criteria for A/S?**

A:

- Epstein criteria is for active surveillance selection
- (Size < 0.2 ml) (Gleason < 6 ) no – 4, no-5
- Density =/< 0.15
- Velocity < 0.75
- Fewer than 3 cores involved with no core > 50% involved

### **Q: what is Kattan's nomogram for indolent Ca?**

A: Statistical model to predict the indolent Ca

- PSA
- Gleason's score
- USG – volume
- % of cores positive



predicts indolent Ca

### **Q: what is the recent ongoing trial on active surveillance?**

A: START: "Surveillance Therapy" against "Radical Therapy"

### **Q: what is the lead time gained by PSA screening?**

A: 10 yrs

PSA will detect CaP 10 yrs ahead of DRE or clinical manifestation.

### **Q: what are the famous A/S trials?**

A: Klotz & Klotz et al Trial

Vandenberg et al Trial

### **Q: what is the famous staging in Ca-P?**

A: D'Amico risk staging.

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**RADIOTHERAPY FOR PROSTATE CANCER**

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**Q: what is the white paper statement for Ca-P management?**

A:

- Rad prostatectomy ( Px) is gold std
- Radiotherapy is 2<sup>nd</sup> best
- If rad Px is not feasible – pt not willing, - advanced stage  
Then Radiotherapy is the next best modality.
- ➔ Radiotherapy treatment should always be accompanied by ADT (early ADT) / hormonal therapy.

**Q: what are ind<sup>n</sup> for R.T?**

A:

- Pt not fit, pt not willing
- Advanced Ca-Prostate **T<sub>3a</sub> | T<sub>3b</sub> | T<sub>4</sub>**
- Post surgical residual | margin +ve
- Locally recurrent
- Bone METs

**Q: what is dose of radiotherapy?**

A: 78 Gy EBRT

**Q: what are the C/Indn for Radiotherapy?**

A:

Bowel disorders

- H/O Bowel irradiation
- H/O ulcerative Colitis
- H/O Diverticulitis

Kidney Cond'n

- Solitary kidney

Uncontrolled DM

Severe LUTS

**Q: what are the complications of EBRT?**

A:

- Urinary toxicity / Bladder Toxicity
- Intestinal toxicity / Bowel Toxicity
- Erectile Dysfn
- Lower limb edema
- Secondary Malignancies

**Q: what are the Secondary Malignancies?**

A:

- Hematological Malignancies,
- Rectal cancer (2 fold Risk)
- Bladder cancer (2 fold risk)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the grades of E.D (Post OP) or (Post Radiotherapy?)**

A: E.D.

Grade 0 – no erectile dysfn

Grade 1 – Erection +ve but not sufficient for interaction

Grade 2 – erection with difficulty

Grade 3 - no erection

ED x – cannot be assessed / no sexual desire / other deformation psychological etc.,

**Q: what is the best predictor for post radiotherapy erectile dysfunction?**

A: Radiation to the Penile urethral “bulb” (not glans)

**Q: what are the RTOG (Radiation Therapy Oncology Group) grades of toxicity?**

A: **Urinary toxicity**

Grade ii

- Moderate frequency
- Intermittent hematuria
- Bldr capacity > 150
- Gen Telengactasia on cystoscopy

Grade iii

- Severe frequency
- Frequent hematuria
- Capacity < 150 ml
- Severe Telengactasia on cystoscopy

Grade iv

- Necrosis , contracted bladder < 100 ml
- Hemorrhagic, cystitis

Grade v:

- Fatal toxicity

**Bowel Toxicity**

Grade ii

- Need for >2 anti-diarrhoeal / wk
- Occasional Blood Transfusion / steroid enema

Grade iii

- More severe & frequent than grade ii

Grade iv

- Perforation / bleeding

Grade v:

- Fatal toxicity

**Q: what is IMRT?**

A: Intensity modulate Radiotherapy

Dose = 60 Gy, dose can be escalated to 86 Gy

**Q: How will you check the position of Prostate for radiotherapy?**

A:

1. By implanting Fiducial markers
2. Balloon immobilization devise.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: how will you fl/up a pt after EBRT / IMRT?**

A: Sr. PSA @ 3 months for 2 yr  
@ 6 months thereafter for life long

**Q: what is a nadir value?**

A: lowest value is called nadir value

**Q: what is the expected value of Nadir after radiotherapy?**

A:

0.5 ng/ml = good control (@ 24-30 months)

1.0 ng/ml = recurrence / local failure

2.0 ng/ml = metastasis likely

**Q: how will you define failure after radiotherapy?**

A:

- astro criteria
- Phoenix criteria.

**Q: what is Astro Criteria?**

A:

- After 2 yrs of treatment 3 consecutive rise @ 6 months apart
- Date of failure is half way between nadir & 1<sup>st</sup> failure rise.

**Q: what are Phoenix criteria?**

A: Any PSA value > 2 ng/ml above of NADIR value

**Q: what are the most imp criteria to be seen in a pt of biochemical PSA increase after radiotherapy?**

A: **Kuban's factors**

- PSADT < 10 mo
- Time to failure < 2 yrs

**If Gleason score (>= 7) is added to Kuban's factors It is then known as Pound's criteria.**

**Q: what does time to NADIR depict?**

A:

- Slow and steady fall of PSA is the best depicter of cancer control.
- Slow and steady fall means prolonged time to reach nadir value
- time to NADIR 24 – 36 months = good control
- time to NADIR 12 – 18 months = local failure
- time to NADIR less than 12 mo = mets (high chances)

**Q: what is P.S.A Bounce?**

A:

- PSA bounce is defined by Merrick et al
- Defined as any rise in PSA of 0.2 ng/ml or more fl/by again fall in PSA (Merrick et al).

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: how will you differentiate P.S.A Bounce from treatment failure?**

A: Phoenix criteria

**Q: what is Brachy Therapy?**

A: Implantation seed therapy with predrilled template (TRUS guided)

- Dose 60 Gy to 160 Gy

**Q: what Isotopes do you use for Brachytherapy?**

A:

- $G.S < 7 \dots I_{125} = \text{dose } 160 \text{ Gy}$
- $G.S > 7 = 103 \text{ Palladium} = \text{dose } 120 \text{ Gy}$  (Palladium for Poorly differentiated tumour).

**Q: what is the specific toxicity of Brachytherapy?**

A:

- Urethral Damage
- Urinary Ret<sup>n</sup>
- ↑↑↑ LUTS
- Urinary incontinence
- Rectal Morbidity
- Erectile dysf<sup>n</sup>
- Seed migration

**Q: in which pts you will not give brachytherapy?**

A:

- Post TURP
- PFUDD repair

**Q: what is high dose Brachytherapy?**

A:

- High dose of Radiation
- Short course (1 wk) Treatment
- Pre drilled Template
- *One thin radiation source is sequentially introduced in one hole followed by 2<sup>nd</sup> then 3<sup>rd</sup>, 4<sup>th</sup> and so on ...*
- No seeds implanted
- Source of radiation is removed after radiation
- Dwell time in each hole is 15-20 min

**Q: what are ind<sup>n</sup> for brachytherapy?**

A:

- Prostate volume < 50 gm
- Gleason < 7
- No Previous TURP
- PSA < 10
- Good IPSS (IPSS less than 12)
- stage localized tumours T<sub>1</sub> –T<sub>2A</sub>

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Is there any benefits of giving neo adj / adjuvant ADT with Brachytherapy?**

A: No use, Pt selection for Brachytherapy is such that pt is at a very low risk group. So no need for ADT.

**Q: what are the side effects of Brachy therapy?**

A: Urinary Retn ↑↑ LUTS Urinary Incontinence Rectal Morbidity Erectile Dysf <sup>n</sup>	}	Tamsulosin 0.4 mg hs is given before, alongside & after brachytherapy to ↓ LUTS & ↓ AUR
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**Q: How can you give Brachytherapy to a high risk Ca P (eg. Gleason > 7 , PSA > 10 , gland size > 50gm)?**

A: Give Brachytherapy (60 Gy)+ EBRT / IMRT (44 Gy)

- Toxicity is reduced
- Better QOL
- Better oncological control.

## **ENERGY ABLATION**

**Q: what are the energy ablation methods for Ca-P?**

A: Cryo, HIFU

**Q: what is Cryo therapy?**

A: Mechanism of tissue destruction using sub freezing temperatures.

Gas Used – Helium / Argon

Principle – Coagulation Necrosis

Mechanism – freezing , crystallization

- Mechanical destruction
- Reperfusion injury

Real time imaging is possible

**Q: what is the rate of freeze and thaw?**

A:

Rate of freezing - fast

Rate of thaw – slow

Nadir Temp = (- 40<sup>0</sup>)

Duration of freezing 10 min

No of freeze / thaw cycles = 2

**Q: what are the patient selection criteria for cryotherapy?**

A: as primary therapy

- Gland < 40 gm
- PSA < 10
- G.S =/ < 7
- T<sub>1</sub> T<sub>2</sub> localized
- Post Radiotherapy salvage therapy
- For management of Post Radical prostatectomy – tumour bed Recurrence.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the C/ indications for cryotherapy treatment?**

A:

- Prior TURP,
- High Grade LUTS
- Active UTI
- Large gland size
- APR Rectal stenosis / Anal fissure
- H/O urethral stricture disease

**Q: what are the complications of cryotherapy?**

A:

- Urethral sloughing
- Urethral stricture
- Urinary Incontinence
- ED
- Fistula formation
- [Transient urinary Retention] = most common complication

**Q: What is the method for preventing of urethral fistula?**

A: Urethral Warmer.

**Q: what are the types of Cryo Mx?**

A:

- focal prostatic nodule ablation
- lobar prostatic ablation
- subtotal prostate ablation
- near total.

**Q: what is HIFU?**

A: High intensity focused ultrasound ( – Sonablate, - Ablatherm)

Transducer:

- High freq 7 MHz – for Prostate treatment, biopsy,

Focal Point

- 3 x3 x11 mm in size
- 4 cm away from transducer

Principle:

- energy absorbed causes rise in the temperature upto 80<sup>0</sup> c

Effects:

- Seen after 4-6 months
- 15 ml residual gland after 6 months → only fibrosis

**Q: what are the patient characteristics for HIFU?**

A:

- Localized disease T<sub>1</sub> T<sub>2</sub>
- G.S < 7
- PSA < 10
- Gland size < 40 gm

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what will be the PSA Nadir after HIFU?**

A: 10 ng /ml

**Q: Average no of sittings required for HIFU Treatment?**

A: 2 sittings

**Q: what are the complications of HIFU therapy?**

A: same as cryo

**Q: what will you do for cryo failure (or HIFU failure)?**

A:

- Repeat cryo / HIFU
- Radical Prostatectomy
- EXBRT + ADT

**Q: what is the success rate of cryo / HIFU?**

A: 80% to 90% success in properly selected pts.

## **CLINICAL STATE OF RISING PSA**

**Q: What is the ideal NADIR PSA value?**

A:

- Undetectable
- 0.2 ng/ml (not 0.02) for Radical prostatectomy
- 0.5 ng/ml for Radiotherapy

**Q: what is the  $T_{1/2}$  life of PSA?**

A: 2-3 days

**Q: when will you do PSA after Rad Px?**

A: 6 to 8<sup>th</sup> wk (PSA should be undetectable by 6<sup>th</sup> wk)

**Q: what criteria you use for PSA failure after radiotherapy?**

A: Astro / Phoenix

**Q: how will you predict local v/s systemic relapse?**

A:

- low pretreatment PSA
- Gleason  $\leq$  7
- Low clinical / pathological stage
- Late time to biochemical relapse
- Long PSADT



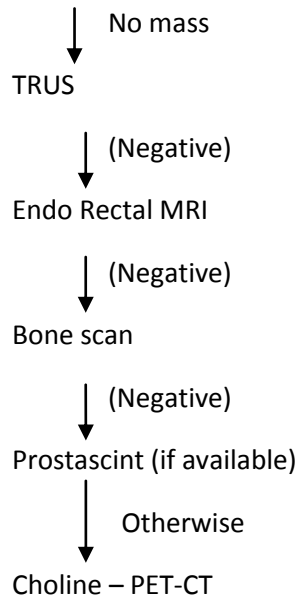
less likelihood of mets

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you proceed in case of rising PSA after radical prostatectomy?**

A: I will take help of imaging techniques & nomograms / criteria

1<sup>st</sup> I<sub>x</sub> DRE



**Q: what is Prostascint?**

A:

- Antibody labeled imaging
- Radiolabelled ' murine Ab' against inner domain of PSMA

**Q: what is the indn of Prostascint in this scenario?**

A: To detect occult metastatic disease in patients of k/c/o Ca Prostate.

**Q: what is the only FDA approved Imaging to detect occults mets?**

A: Prostascint – (available in India as Capromab) cost is Rs.2700/- per injn (0.5 mg)

Capromab is mouse Ab clubbed with radioactive Indium<sup>iii</sup> (5 milli curie) given I.V

Side effects alter LFTS and causes BP fluctuations.

**Q: when will you do biopsies in a post prostatectomy patient?**

A: for post radical prostatectomy=when TRUS / DRE/ MRI depict some mass (post Rad Px)  
for post radiotherapy = Biopsy should be done after 2 yrs.

**Q: what are the models / criteria available to predict the recurrence?**

A:

### **Pound's criteria**

PSADT < 10 month

Biochemical failure in less than 2 yr

Gleason's > 7

} High risk of overt mets.

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Pounds criteria predict conversion of Biochemical failure to overt mets.
- Pounds criteria Qualifies the risk for overt mets & overall survival
- Stratify the Pt – low risk , - high risk

	Gleason	Time to relapse	PSADT
Low risk	< 6	>3 yr	> 10 months
High risk	>7	<3 yr	< 3 months

- Low risk pt can be put on A/S (active surveillance)
- High risk pt requires definitive therapy

**Q: what are the management protocols for rising PSA post local therapy?**

A:

- **increase PSA + local recurrence proven (after Rad Px)**  
EBRT / IMRT /?? Brachy + ADT long term
- **Increase PSA + local recurrence (after Radiotherapy)**  
- Salvage Prostatectomy / Brachy / cryo/ HIFU
- **Increase PSA + No local recurrence (after Rad Px or Radio Ps)**  
Low risk: can wait & watch  
High risk: option 1 is to start ADT  
Option 2 step up ADT

**Q: what is step –up ADT?**

A: Finasteride → Calutide → LHRH Agonists

**Q: How will you choose between ADT v/s radiation therapies in cases of local recurrence?**

A: If the pt is expected to live longer than the average duration of ADT (usually 3-4 yrs) then first radiation therapy is chosen which is then supplemented with ADT.

**Q: what is “Trigger” PSA?**

A: the value of PSA before the start of a salvage therapy (usually radiotherapy)

**Q: why PSA does not come down to absolute zero after Rad Ps**

A: Due to PSA producing Peri-urethral cells.

**Q: what is the general relevance of PSADT?**

A:

- PSADT > 12 months → local recurrence
- PSADT < 4 months → distant mets

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Can a local recurrence occur without PSA ↑?**

A:

1. In cases of highly undifferentiated tumours local recurrence can occur without PSA rise
2. Non – Adenocarcinomas of Prostate.

**Q: what are the S.I units of PSA & testosterone?**

A:

- PSA = ng/ml
- Serum Testosterone = ng /dl

**Q: what are the normal levels of Testosterone?**

A: Upper limit 1200 ng/dl

Lower limit 300 ng/dl

**Q: what are the “non-Adenocarcinomas of Prostate”**

A: These include sarcomatoid carcinoma, ductal Adenocarcinomas, urothelial carcinoma, squamous and adenosquamous carcinoma, basal cell carcinoma, and neuroendocrine tumours, specifically small-cell carcinoma.



---

**Hormonal Therapy**

**Q: who described the orchidectomy as treatment for Ca P?**

A: Huggins & Hodges

(Noble Prize winner for Ox) 1966

**Q: what are the methods of androgen Blockage?**

A:

Orchidectomy – surgical Ox

Antiandrogen

- Steroidal-cyproterone acetate
- Non steroidal – bicalutamide , Flutamide, MDV – 3100 ENZALUTAMIDE

Inhibition of LHRH

- LHRH Agonist – leuprolide (Lupron<sup>®</sup>, Eligard<sup>®</sup>), goserelin (Zoladex<sup>®</sup>), triptorelin and histrelin
- LHRH Antagonist – abarelix, Cetrorelix, ganirelix, - Degarelix

Inhibition of androgen synthesis

- Ketoconazole
- Abiraterone

**Q: what are “the” indications for hormone therapy?**

A:

1. Node +ve disease at presentation
2. Metastatic disease – symptomatic, - asymptomatic
3. Node +ve disease after radical Prostatectomy
4. High Risk category of D’Amico
5. Intermediate Risk category of D’Amico if initially low dose < 75 Gy was given (then give short course = 6 month ADT)

**Q: what is the castrated level of serum Testosterone?**

B: serum T < 50 mg /dl (**currently less than 20 mg/dl**)

**Q: In how much time after orchidectomy, serum testosterone levels reach castration levels?**

A: Testosterone level reaches to Castrate level with 24 hrs of orchidectomy.

**Q: what are the advantages and dis-advantages of Orchidectomy?**

A:

Adv:

- Sure shot way
- No patient compliance required
- Day care surgery
- Waxing & waning pattern of testosterone levels are not there after Ox.

Disadv

- Surgical procedure
- Irreversible
- Intermittent blockade not possible
- May still require Calutide.

**Q: what are anti-androgens drugs?**

A: They are basically AR receptor blockers.

Two types

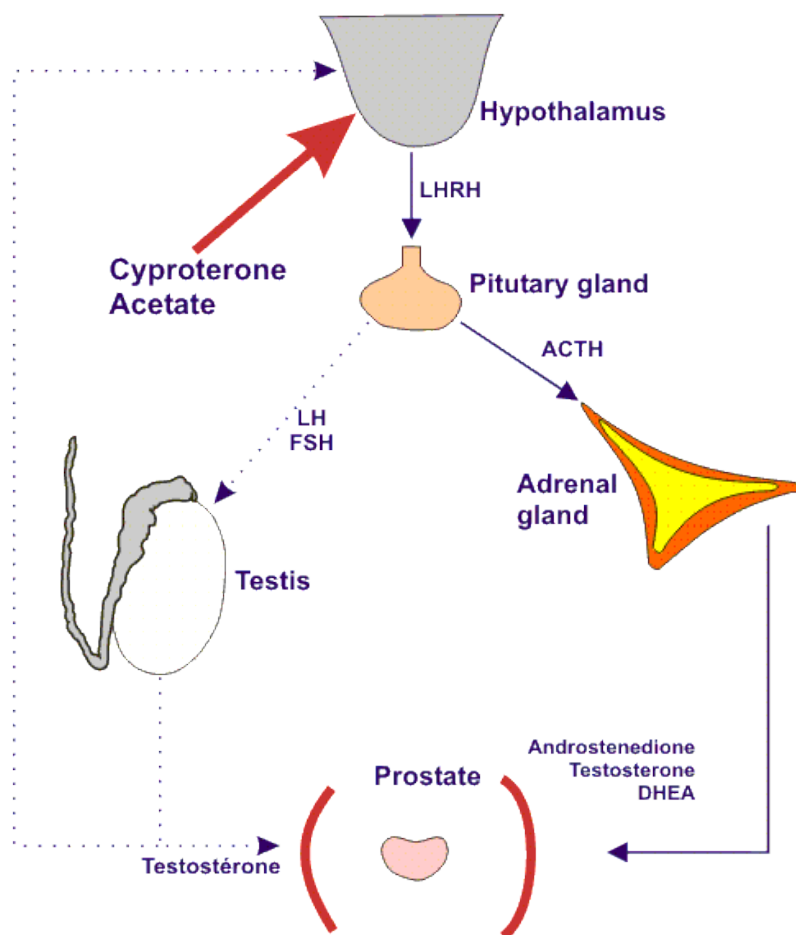
- Centrally acting – (cyproterone)
- Peripheral acting – bicalutamide, - Flutamide

(Centrally acting = steroidal, peripheral acting = non steroidal)

**Q: what is cyproterone acetate?**

A:

- Centrally action → inhibits LH release → decrease in testosterone levels
- Peripheral action → as competitive blocker of AR
- dose 100 mg / TDS
- ADR → Gynecomastia, lassitude, decrease libido, decrease erection



**Q: what are bicalutamide / Flutamide?**

A:

- Antiandrogen → AR receptors-competitive blockers
- Inhibit the testosterone feedback centrally
- Increase LH, Increase testosterone in circulation

↓

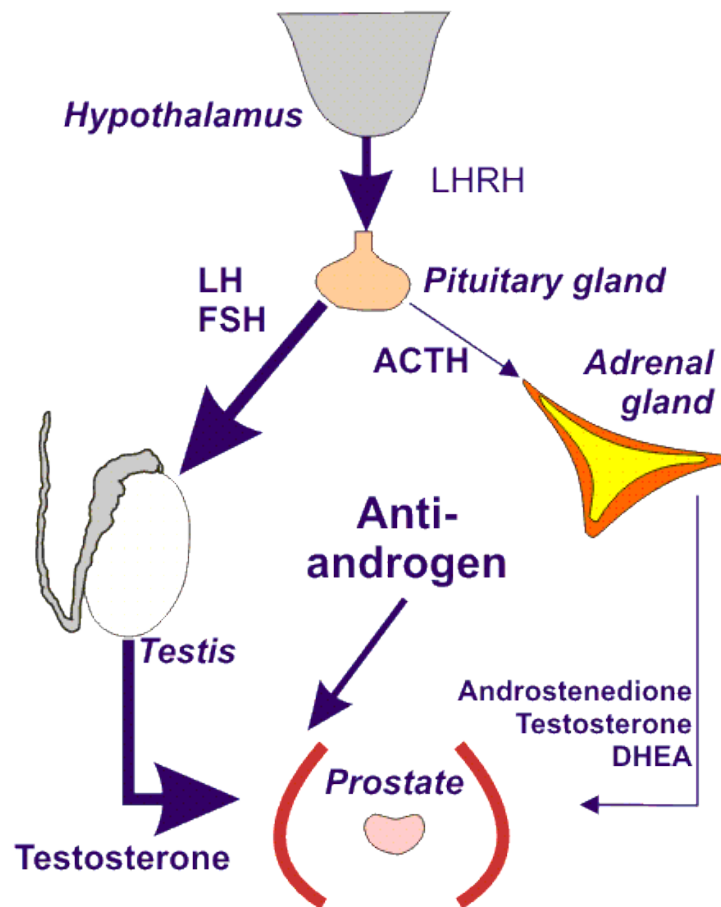
More Gynecomastia (due to peripheral conversion) but less decrease libido & both erection

## Neeraj Sharma's ...Notes For Urology Practicals

Dearranged liver functions, Gynecomastia, Mastodonia, Hot flushes

Dose – Flutamide – 250 mg TDS oral

Bicalutamide – 150 mg /OD (monodrug therapy), 50 mg/day (in combination therapy)



**Q: what is the mechanism of LHRH agonist?**

**A:** continuous active exposure leads to desensitization of LHRH recep in pituitary

↓  
Decrease LH secretion by pituitary

↓  
Decrease Testosterone prod<sup>n</sup>

- eg: LHRH Agonist – leuprolide (Lupron<sup>®</sup>, Eligard<sup>®</sup>), goserelin (Zoladex<sup>®</sup>), triptorelin and histrelin

**-Dose of Luperolide Acetate depot-cost = Rs. 10,000 per inj<sup>n</sup> , 22.5 mg. i.m./@ 3 monthly**

## Neeraj Sharma's ...Notes For Urology Practicals

**Q: what are most common side effects of LHRH agonists?**

A: flare up phenomenon

Rx- give Calutide 50 mg/OD starting 7 days prior to LHRH agonist injection and continue for 28 days post injection.

**Q: what are the examples of LHRH antagonists?**

A: LHRH Antagonist – abarelix, Cetrorelix, ganirelix, - Degarelix

**Q: what is the dose of Degarelix?**

A: LHRH Antagonist

Dose :

### **Hormone-dependent Advanced Prostate Carcinoma**

Initial: 120 mg SC for 2 doses (ie, 2 separate injections totaling 240 mg), THEN after 28 days, begin maintenance dose of 80 mg SC q28Days

### **Renal Impairment**

≥50 mL/min: Dose adjustment not necessary

<50 mL/min: Use caution

### **Hepatic Impairment**

Mild-to-moderate: Dose adjustment not necessary

Severe: Safety and efficacy not established; use caution

### **Administration**

Initiation pack contains 2 vials each with 120 mg per vial & 6 mL sterile water for injection diluent



**Q: what are the advantages and disadvantages of LHRH antagonist?**

A: Adv:

- No LH flare up phenomenon
- No need to add Calutide
- Can be given in patients of Impending spinal cord compression
- Can be given in patients of Severe bone pain

Adverse effects- Histamine related side effects.

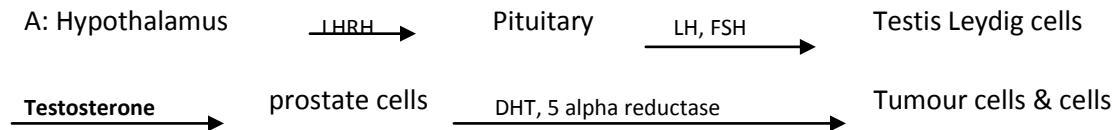
## Neeraj Sharma's ...Notes For Urology Practicals

### Q: what are net sources of androgen?

A: Testis (95%) → produces Testosterone / DHT

Adrenal (5%) → produces androsterdione (As) DHEA ( De-Hydro-Epi-Androstenedione (DHEA)

### Q: what is the hormonal axis (HPA) for ca- prostate?



### Q: what is more potent T or DHT?

A: DHT is 10 times more potent

### Q: what are drugs inhibiting androgen synthesis

A: Ketoconazole } CYP 17 inhibitors

Abiraterone }

Aminoglutathimide }

Inhibit steroidogenesis }

Abiraterone: Dose 1000 mg / OD / empty stomach

(Needs to be given with Prednisolone)

Side effects: leads to increase mineralocorticoid, HTN, hypokalemia, pedal edema (Conn's syndrome)

Contra/Indications → HTN / CHF

### Q: what are the current indn for giving complete androgen blockade CAB?

A:

1. Rising PSA after LHRH against / antagonist / Orchiectomy
2. To prevent flare up phenomenon.

### Q: what is anti androgen withdrawal phenomenon?

A: Described by KELLY

- combination of LHRH + anti androgen → decrease in PSA
- With time slow increase in PSA (PSA escape)
- Withdrawal of bicalutamide (anti androgen recp blocker) at this stage leads to decrease in PSA
- This ironical fall in PSA with withdrawal of AR is called anti-androgen withdrawal phenomenon
- Even objective response is seen

### Q: what are the effects of anti androgen withdrawal phenomenon?

A:

- Decline in PSA seen @ 4 wks after Flutamide withdrawal and 6 wks after Calutide withdrawal,
- 30% Pt drop PSA by 50%
- Tumour size doesn't decrease
- Overall survival not improved

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Do you withdraw LHRH analogues also?**

A: No, PSA escape is due to AR mutations so only AR inhibitors are withdrawn.

**Q: what are the complications of androgen blockade?**

A: ANDROGEN BLOCKADE

- A Anemia
- N Norphan mediated hot flushes
- D Diabetes & metabolic disorders
- R Retardation Mental
- O Osteoporosis
- G Gynecomastia
- E Erectile Dysfn
- N Nausea/ Vomiting/ GI upset (maximum is 1<sup>st</sup> few months)
- B Body habits changes (occurs maximum in 1<sup>st</sup> year)

**Q: how will you measure Bone minerals density BMD?**

A: DEXA Scan Dual Energy X-ray Absorption Scan

There are two types of DEXA scans:

- Central DEXA. Patient lies on a soft table. The scanner passes over lower spine and hip. This scan is the best test to predict risk of fractures.
- Peripheral DEXA (p-DEXA). These smaller machines measure the bone density in wrist, fingers, leg, or heel. These machines are in doctor's offices, pharmacies, shopping centers, and at health fairs.

The results of your test are usually reported as a T-score and Z-score:

- T-score compares your bone density with that of healthy young women.
- Z-score compares your bone density with that of other people of your age, gender, and race.

With either score, a negative number means you have thinner bones than average. The more negative the number, the higher your risk of a bone fracture.

a T-score is within the normal range if it is -1.0 or above.

If T-score is:

- Between (-1) and (-2.5) suggests early bone loss (osteopenia).
- Below (-2.5) suggests osteoporosis.

**Q: how will you define Osteoporosis?**

A: bone density of 2.5 std Deviations below mean

**Q : after what duration of ADT a patient can have osteoporosis?**

A: 4 yrs

**Q: what are the chances of # in a patient in ADT?**

A:

- 20% pts on ADT have fractures
- Hip fractures are most common.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: how can you prevent osteopenia/Osteoporosis?**

A:

- $\text{Ca}^{++}$  supplementation
- Vit D
- Zolendronate

**Q: what are Hot flashes?**

A:

- Subjective feeling of warmth in upper torso & head.
- m/c side effects of ADT (50 – 80%)
- Hot flushes appear after 2-3 months of ADT.

**Q: How will you manage hot flashes?**

A:

- Megesterol Acetate
- Cyproterone acetate
- Venlafaxine 125 mg
- Estradiol

**Q: how will you prevent painful Gynecomastia?**

A: Prophylactic radiation therapy 10 Gy to bilateral breasts (only prophylactical, no use afterwards )

**Q: what is complete androgen blockade?**

A: Castration (Medical or Surgical) Plus blocking the actions of testosterone produced by adrenals

Indications

1. rising PSA even after castration,
2. to prevent flare up phenomenon

**Q: How do you achieve CAB?**

A: LHRH analogues / surgical Orchidectomy

Plus

Anti androgen (Calutide / Flutamide)

**Q: what are adv and dis adv of CAB?**

A:

Adv:

- Total suppression of testosterone
- Better control of PSA
- Better Tumour control
- Anti androgen withdrawal phenomenon can happen only with CAB
- Prevention of Flare up phenomenon

Dis adv:

- Added cost
- No survival benefits
- More pronounced side effects. GIT side effects/sexual side effects/Hematological side effects

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is intermittent androgen therapy?**

A: stopping of ADT when nadir has reached and then re-starting when PSA triggers

- Lengthen the time to become frank CRPC
- Intermittent normal level of testosterone
- Better survival, better Q.O.L.
- Less Cost

### **Q: what are Intermittent androgen deprivation (IAD)therapy protocols?**

A: Remember that IAD patients are of two types

1. Biochemically relapsing
2. Proven metastatic

The 'Trigger' PSA values & "stop"" PSA values are

	<b>Biochemical relapse</b>	<b>metastatic disease</b>
<b>Stop</b>	0.5 ng/ml	4ng/ml
<b>Start again</b>	4ng/ml	10 ng/ml

- So 1<sup>st</sup> cycle of LHRH antagonist is minimum for 6 months
- Once values Reach to stop value / anytime after 6 mo – or but before 9 month --Stop ADT
- Keep strict PSA fl/up @ 3-6 months: PSA values will keep gradually rising. Once PSA touches the Trigger value start again for 3-6 months
- Keep repeating this cycle

### **Q: what drugs can be given in off periods (in IAD)?**

A: Finasteride or COX-2 inhibitors can be given in off periods

### **Q: How will you decide for metabolic (not metastatic) syndrome?**

A: Metabolic syndrome criteria are

- Waist circumference > 102 cm
- Waist / hip ratio > 1 for males and >0.8 for female
- BP > 130/80 mm hg

Raised Triglycerides / Cholesterol / sugar.

### **Q: how will you fl/up these pt (on hormonal therapy)?**

A: PSA+ DRE @ 3 mo, @ 6 mo

- For M<sub>0</sub> (only biochemical failure) fl/up @ 6 months for life long
- For M<sub>1</sub> (metastatic) Fl/up @ 3 months for life long
- For M<sub>1B</sub> regular (spine assessment by orthopedic /neuro surgeon)



**Q: How will you define CRPC?**

A: Serum castration levels of testosterone (< 20 ng/dl) (or H/o orchidectomy) along with -3 successive Rises in PSA values, 1 wk apart, out of which atleast 2 are more than 50% increase above nadir along with Anti androgen withdrawal for atleast 4 wks.

Learn and by-heart this definition word by word as this is the most frequently asked question

**Q: what are the causes of CRPC?**

A:

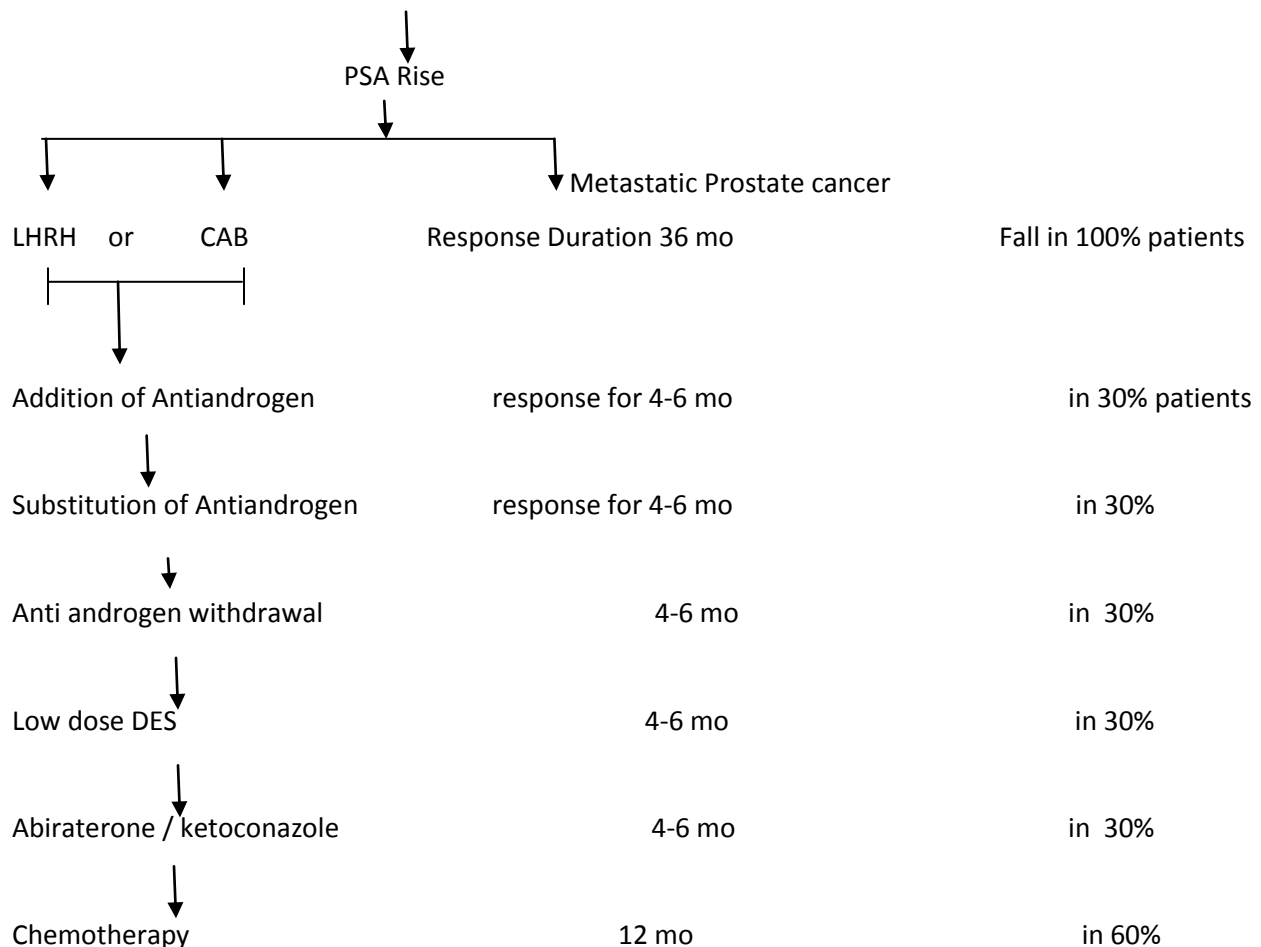
1. AR hyper sensitivity: that is they respond to even micro levels of testosterone
2. By-pass AR: intracellular mechanism
3. Outlaw AR:
4. AR promiscuity
5. Lurker cell model: new generation of AR independent cells.

**BHOPAL:**     **B**y-pass, **H**ypersensitivity, **O**utlaw, **P**romiscuity, **A**ndrogen independent **L**urker cells

**Q: What is sequential hormonal approach?**

Basic Rx:

Radical Px / Radiotherapy



**Q: how can CRPC manifest?**

A:

1. Non metastatic CRPC
2. Metastatic CRPC

**Q: what is non metastatic CRPC?**

A:

- Only rising PSA i.e., biochemically programming M<sub>0</sub>
- Lead time= 8 months before clinical manifestation
- management – sequential hormonal approach

**Q: what are the symptoms of bone affected pts?**

A: Presentation:

- Asymptotic initially
- Bone & joint pain
- Relentless, continuous pain
- Spinal cord compression.

**Q: why Bones are affected most?**

A: Because circulating tumour cells get entrapped in bone's cortical & medullary spaces.

**Q: what type of mets & bones are there in ca prostate?**

A: Osteoblastic / long Bones & vertebrae (lumbar)

**Q: what are the effects on Bone?**

A:

- Periosteum stretch → Bone Pain
- Cortical Dystrophy → Fracture
- Medullary failure → Anaemia Pancytopenia

**Q: when will you suspect bone mets?**

A:

- Pt symptomatic of bone pain
- PSA > 20,
- Raised Sr. ALK phosphatase (upto 120 I.U/litre)

**Q: How will you investigate for bone mets?**

A: investigations–

- Bone scan
- PET scan –FDG, 11 Choline-PET scan
- Prostatecint

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: How will you manage bone mets?**

A: Zolendronate 4mg/100ml in N.S. iv monthly + vit D + calcium along with EBRT.

Protocol 1 = 800 cGy EBRT stat

=300cGy EBRT x 10 sittings

### **Q: when will you offer prophylactic Sx fixation for bone metastasis?**

A:

1. Intra medullary lytic lesion > 50% of Cross sectional diameter of bone
2. Lytic lesion involving cortex, length of lesion > cross sectional diameter
3. Lytic lesion > 2.5cm in axial length

### **Q: which Radio nucleotide will you use for treatment of bone metastasis?**

A:

- Strontium 89 → Rs. 1,20,000/per injection
- Samarium 153- is better – shorter  $T_{1/2}$  = 2 days

### **Q: what will you do for spinal cord compression?**

A: Heavy dose steroids

### **Q: At what % of bone involvement is depicted as mets?**

A:

- for x ray – 50% of bone involvement is depicted as mets
- CT – 20% of bone involvement is depicted as mets
- Bone scan – 10% of bone involvement is depicted as mets.

### **Q: what are the usual PSA Values at which Bone scan in +ve?**

A: mean PSA value > 60 ng/ml

### **Q: at what PSA level; Bone scan is indicated?**

A: above 20 mg/ml (EAU guidelines)

### **Q: what is NHTRT?**

A: Neo adj Hormonal Therapy + Radiotherapy + Adj hormonal therapy.

Neo adj Hormonal (3 months) + Radiotherapy (within 3 mo) + Adj hormonal therapy (for 3 yrs).

### **Q: what is chemotherapeutic agent of choice for metastatic CRPC?**

A: Docetaxel

- TAX – 327 study
- Dose -75 mg/m<sup>2</sup> / IV @ 3 wks
- Always with Prednisolone
- MOA → microtubule stabilization & BCL -2 Phosphorylation (apoptotic Pathway)
- Overall survival Benefit = 12 – 13 months
- Side effects  
Anaemia, Neutropenia, bone marrow suppression  
Nausea, vomiting , neuropathy.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: describe the TAX -327 TRIAL?**

A:

- From March 2000 through June 2002, 1006 men with metastatic hormone-refractory prostate cancer received 5 mg of prednisone twice daily and were randomly assigned to receive 12 mg of mitoxantrone per square meter of body-surface area every three weeks, 75 mg of Docetaxel per square meter every three weeks, or 30 mg of Docetaxel per square meter weekly.
- The primary end point was overall survival. Secondary end points were pain, prostate-specific antigen (PSA) levels, and the quality of life. All statistical comparisons were against mitoxantrone.
- **CONCLUSIONS:** When given with prednisone, treatment with Docetaxel every three weeks led to superior survival and improved rates of response in terms of pain, serum PSA level, and quality of life, as compared with mitoxantrone plus prednisone.
- **Please read :** Docetaxel plus prednisone or mitoxantrone plus prednisone for advanced prostate cancer. N Engl J Med. 2004 Oct 7; 351(15):1502-12.

**Q: what will you give for Docetaxel failure?**

A: CABAZITAXEL

- FDA Approved
- Surgical Benefits 10 months

**Q: what are bisphosphonates?**

A: Compounds with two Phosphonates groups

Bone undergoes constant turnover and is kept in balance (homeostasis) by osteoblasts creating bone and osteoclasts destroying bone. Bisphosphonates inhibit the digestion of bone by encouraging osteoclasts to undergo apoptosis, or cell death, thereby slowing bone loss.

The uses of bisphosphonates include the prevention and treatment of osteoporosis, osteitis deformans ("Paget's disease of bone"), bone metastasis and other conditions that feature bone fragility.

**Q: what is the mechanism of action of bisphosphonates?**

A:

Nitrogen-containing bisphosphonates bind to and inhibit the activity of farnesyl pyrophosphate synthase, a key regulatory enzyme in the mevalonic acid pathway critical to the production of cholesterol, other sterols, and isoprenoid lipids. As such, the posttranslational modification (isoprenylation) of proteins (including the small guanosine triphosphate-binding proteins Rab, Rac, and Rho, which play central roles in the regulation of core osteoclast cellular activities including stress fiber assembly, membrane ruffling, and survival) is inhibited, ultimately leading to osteoclast apoptosis.

Interestingly, whereas farnesyl pyrophosphate synthase is ubiquitously expressed in mammalian cells and has a critical role in lipid production, cellular apoptosis induced by nitrogen-containing bisphosphonates appears to occur only in osteoclasts.

In simple words, pyrophosphate is an enzyme which is essential for osteoclasts survival and growth. Nitrogenous bisphosphonates block this pyrophosphate enzyme leading to apoptosis of osteoclasts and thus preventing bone resorption.

**Q: what are the types of Bis-Phosphonates?**

A: Nitrogenous and Non nitrogenous

↓  
Zolendronate  
Alendronate  
Pamidronate

**Q: what are the side effects of bisphosphonates?**

A

- Gastritis, Oesophagitis-Oral bisphosphonates can cause upset stomach and inflammation and erosions of the esophagus, which is the main problem of oral N-containing preparations. This can be prevented by remaining seated upright for 30 to 60 minutes after taking the medication
- Flu like symptoms: Intravenous bisphosphonates can give fever and flu-like symptoms after the first infusion, which is thought to occur because of their potential to activate human T cells.
- Osteonecrosis of Jaw --Bisphosphonates, when administered intravenously for the treatment of cancer, have been associated with osteonecrosis of the jaw (ONJ), with the mandible twice as frequently affected as the maxilla and most cases occurring following high-dose intravenous administration. It has been suggested that bisphosphonates treatment should be postponed until after any dental work.
- Increase Creatinine, increase CKD chances

**Q: what is Denosumab?**

A: Human monoclonal antibody against RANKL

- RANKL inhibitor
- Prevents maturation of Osteoclasts from Pre-osteoclasts
- 120mg/s.c./@ 4 weeks
- Prevents Osteoporosis at vertebrae, hip joint & distal radius
- Not affected by kidney functions for alterations
- Check serum. calcium before starting the drug and before each inj<sup>n</sup>
- Denosumab causes severe hypocalcaemia & Osteonecrosis of jaw
- Hypersensitivity is a contra-ind<sup>n</sup>



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what other agents can be tried in Ca-Prostate?**

A:

- mTOR inhibitor
- AKT pathway inhibitor
- TKI inhibitors

**Q: what are Atrasentan / Zibotenten?**

A: Endothelin A-receptor Inhibitors

- Delay the bone mets

**Q: What is Sipuleucel-T?**

A;

- Provenge (FDA approved)
- Autologous dendritic cell cancer vaccine
- Sipuleucel-T (trade name Provenge), manufactured by Dendreon Corporation, is a cell-based cancer immunotherapy for prostate cancer (CaP).
- It is a personalized treatment that works by programming a patient's own immune system to seek out cancer spreading in the body, and attack it as if it were foreign.
- It must be prepared specifically for each patient. In metastatic prostate cancer, it has extended survival by median 4.1 months (IMPACT Phase III trial data). Improvements in 3-year survival rates have also been shown, with 31.7% of treated patients surviving for 36 months vs. 23.0% in the control arm.
- The treatment cost \$93,000 at FDA approval,

**Q: what are the steps of making Sipuleucel-T?**

A: Steps:

1. Take blood sample from patient
2. Extract dendritic cell (WBC from blood sample)
3. Incubate with prostatic acid phosphatase (PAP)
4. Add GM-CSF (activated blood products)
5. The activated blood product is returned from the production facility to the infusion center and re-infused into the patient to cause an immune response against cancer cells carrying the PAP antigen
6. Inject again back on Day <sub>0</sub>, Day <sub>15</sub>, and Day <sub>30</sub>

**Q: what is the dosage schedule for Sipuleucel-T?**

A: A complete Sipuleucel-T treatment repeats three courses, with two weeks between successive courses Day <sub>0</sub>, Day <sub>15</sub>, and Day <sub>30</sub>

**Q: describe IMPACT TRIAL?**

A:

- The IMPACT trial served as the basis for licensing approval of sipuleucel-T by the FDA. This trial enrolled 512 patients with asymptomatic or minimally symptomatic metastatic HRPC randomized in a 2:1 ratio.
- The median survival time for Sipuleucel-T patients was 25.8 months comparing to 21.7 months for placebo-treated patients. Overall survival was statistically significant (P=0.032).

## **Neeraj Sharma's ...Notes For Urology Practicals**

- However, a better control group would have included patients receiving white blood cells incubated with GM-CSF alone, so that the main difference between the two groups would have been the tumor antigen. Furthermore, the longer survival without tumor shrinkage or change in progression is surprising. This may suggest the effect of an unmeasured variable.
- Survival Benefit = 4 months IMPACT trial

### **Q: what is GVAX?**

A: allogenic whole cell vaccine

Prostate cancer cell lines PC<sub>3</sub>, LNCaP Are infected with adenovirus & irradiated to prevent cell division inject intradermally.

The GM-CSF-secreting vaccine GVAX was a mixture of the PCa cell lines PC-3 and LNCaP transduced with a replication-defective retrovirus containing cDNA for GM-CSF and then irradiated. In an earlier trial, GVAX platform-based immunotherapy was administered to 34 patients with metastatic chemonaive CRPC.

This trial demonstrated a complete PSA response (PSA level dropped to 0.1 ng/mL) in 1 patient, a reduced PSA velocity in 73% of patients, stabilized or decreased levels of a biomarker of osteolytic activity in 69% of patients, and produced median survival times of 34.9 and 24 months with the high and low doses of immunotherapy, respectively. The agent was subsequently modified to increase GM-CSF production.

**Table 1** Recently Approved Agents for Castrate-Resistant Prostate Cancer (CRPC)

Name	Class	FDA Approval	Regimen	Mechanism of Action	Disease Setting	Comments
Sipuleucel-T	Autologous cellular immunotherapy	April 2010	Doses (IV) every 2 weeks × 3 doses	Ex-vivo processing of patient's dendritic cells with PA2024	CRPC, metastatic with minimal or no symptoms	Patient's blood is collected via leukapheresis and shipped to a central facility for processing; no PFS advantage noted
Cabazitaxel	Microtubule inhibitor	June 2010	25 mg/m <sup>2</sup> IV every 3 weeks with prednisone 10 mg PO daily	Microtubule stabilization	CRPC, metastatic after docetaxel chemotherapy	Increased incidence of neutropenia and neutropenic fever noted in phase III trial
Abiraterone acetate	CYP17 inhibitor	April 2011	1000 mg PO daily with prednisone 5 mg PO BID	Inhibits androgen synthesis in adrenal gland and prostate cancer cells	CRPC, metastatic after docetaxel chemotherapy	Associated with symptoms of mineralocorticoid excess (hypertension, edema, hypokalemia)
Denosumab (Xgeva)	RANK ligand inhibitor	November 2010	120 mg SQ every month	Human monoclonal antibody against RANK ligand	CRPC, metastatic bone disease	For the prevention of skeletal-related events
Denosumab (Prolia)	RANK ligand inhibitor	September 2011	60 mg SQ every 6 months	Human monoclonal antibody against RANK ligand	High-risk for skeletal-related event while on ADT for prostate cancer (nonmetastatic)	To increase bone mineral density in those on ADT and at high risk in the nonmetastatic setting

ADT = androgen-deprivation therapy; BID = twice daily; IV = intravenous; PFS = progression-free survival; PO = by mouth; RANK = receptor activator of nuclear factor kappa-B; SQ = subcutaneous.

**Q: what is the white paper rule of Mx Ca P**

A:

T-1 low risk—active surveillance

T-1 intermediate or high risk—radical prostatectomy

T<sub>2</sub> → radical prostatectomy, margin +ve post surgery → Radiotherapy

T<sub>3</sub> → Radiotherapy

T<sub>4</sub>- Hormones

**Q: Why Ca bladder / Ca Prostate metastasize to lumbar vertebrae?**

A: due to Batson's Plexus.

**Q: what is Batson's Plexus?**

A: Valveless veins that connect the prostate and inferior surface of Bladder, to vertebral Bodies (inter vertebral venous plexus)



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**Guideline's statements**

*Based on EAU guidelines*

**"T- Staging"**

**Q: what is D'Amico Risk stratification?**

A:

Risk	Stage	Gleason's	PSA
Low	T <sub>1</sub> -T <sub>2a</sub>	=/ $\leq$ 6	0-10
Intermediate	T <sub>2b</sub>	7	10-20
High	T <sub>2c</sub> – T <sub>3a</sub>	$\geq$ 8	$> 20$

**Q: what are PARTIN Tables?**

A: Partin's table are comprehensive outcome of D'Amico risk factors tumour stage/Gleason / PSA Result

It depicts probability of

1. Organ confined
2. Extra prostatic involvement
3. Seminal vesical involvement
4. Lymph node involvement.

**Q: what is cancer risk calculator?**

A: Combines several factors like age, Race, Family H/O PSA, DRE finding, to predict your personalized Ca Risk EORTC calculator for values  $> 12.5$ , Biopsy is indicated

**Q: if post TURP chips biopsy report is suggestive of ca Prostate, when will you do PSA, if not done before?**

A: after 6 weeks, to let the post TURP tissue inflammation and infection settle down .

**Q: when will you do MRI –pelvis of the above patient?**

A: after 6 to 7 weeks post TURP

**Q: when will you do seminal vesicle biopsy?**

A: When it may likely to change treatment plan

Usually @ PSA  $> 20$

Clinically T<sub>2b</sub>

**Q: when will you do TZ biopsy?**

A: during Repeat biopsy

**Q: will you do MRI first or Biopsy first?**

A: -MRI first

- Post biopsy MRI has many artifacts related to post biopsy hemorrhage & inflammatory changes.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what group of LN will you remove routinely?**

A: Hypogastric, Obturator, Pre sacral - not removed , Ext iliac .

**Q: what will you do if during op<sup>n</sup> LN is +ve?**

A: If LN is +ve then also I will complete the Rad prostatectomy

**Q: what are MRI – Spectroscopy variables?**

A:

1. Choline
2. Citrate
3. Creatinine
4. Polyamines

**Q: what are the dietary recommendations advisable to prevent Ca- Prostate (EAU )?**

A: low animal fat

More fruits & vegetables

**Q: suppose a pt is put on screening; what will be the age /screening components & screening intervals?**

A:

- The age @ 1<sup>st</sup> screening should be atleast 40 yrs age
- Screening components → PSA + DRE
- Interval to call again → after 8 yrs for PSA + DRE

**Q: Can you do TRUS biopsy prostate straight away for raised PSA?**

A: No, ideally PSA should be repeated after 3-4 wks

if still raised → go ahead for TRUS Biopsy.

**Q: what will you do if saturation biopsies are also negative?**

A: MRI spectroscopy guided biopsies using Choline/citrate ratios.

**Q: when will you do transitional zone biopsy?**

A: T2 biopsies are done during repeat biopsies when original biopsy procedures were negative inspite of raised PSA.

**Q: when will you do seminal vesicle Biopsy?**

A:

1. When on TRUS ultrasound/ MRI seminal vesicle involvement is suspected
2. if a pt of high risk category is opting for only Brachytherapy

**Q: what is the anaesthesia used for TRUS biopsy?**

A: Periprostatic Block

**Q: what are the typical pre OP orders for TRUS Biopsy?**

A: For TRUS biopsy scheduled on day 'O'

Tab Gasex 2-2-2 (day before procedure)

Tab Dulcolex 2 hr (night before procedure)

Tab metrogyl 1 hr before procedure

## **Neeraj Sharma's ...Notes For Urology Practicals**

Inj Amikacin -1 hr before procedure.

Enema on the morning of TRUS-Biopsy

**Q: what is the minimum Gleason's score on TRUS biopsy?**

A: '4'; score cannot be lower than 4

**Q: what is 5% rule of Gleason's scoring?**

A: In Rad Px specimen if volume of any grade is  $\leq 5\%$  of total specimen then that grade is not included for scoring. If only one grade is seen then that grade is double to give the score.

**Q: what volume of tumour is clinically significant?**

A: A tumour volume of  $> 0.5$  ml is significant prognostically

**Q: what are the high risk pts for seminal vesicle involvement?**

A:

1. suspected Seminal vesicle involvement on TRUS USG
2. PSA  $> 20$
3. Clinical DRE  $> T_{2B}$

**Q: what is the importance of S.V involvement?**

A: S.V involvement becomes  $T_{3b}$

Radical Prostatectomy is not an option (ideally)

Ideally  $T_{3b}$  should be managed by EBRT or IMRT with short course hormone therapy (Michel bolla study)  
→ EBRT + ADT improves survival in comparison to EBRT alone)

**Q: what is Michel Bolla study?**

A:

- In simple words –adjuvant hormonal therapy should be started in patients undergoing radiotherapy for management of locally advanced ca prostate  $T_{3a}$  onwards
- **Adjuvant Hormonal Therapy Benefits Prostate Cancer Patients Treated With Radiotherapy**  
November 01, 1997 | Genitourinary Cancers, Prostate Cancer By **Michel Bolla, MD**
- To investigate the potential use of adjuvant hormonal therapy, a randomized, prospective trial was conducted among patients with locally advanced prostate cancer, comparing irradiation alone, with irradiation plus hormonal treatment with goserelin, an agonist analogue of gonadotropin-releasing hormone that reduces testosterone secretion. A total of 415 men under 80 years old with locally advanced disease and no previous treatment for prostate cancer were initially recruited, with data available for analysis on 401 of these patients. Preliminary results at 33-months' follow-up **suggested that goserelin started at the onset of external irradiation improved both local control and 5-year survival**. Updated results at 45 months confirm these data.
- See more at: <http://www.cancernetwork.com/articles/adjuvant-hormonal-therapy-benefits-prostate-cancer-patients-treated-radiotherapy#sthash.acOAsou0.dpuf>

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the predictors of extra capsule Extension of ca prostate?**

A

- more than 35% cores in number
- More than 35% tissue as tumour +ve per core
- Gleason > 7 ,
- PSA >10.

**Q: what is moustache sign?**

A: on an axial cut section on MRI, persistence of the angular space between prostate and bilateral seminal vesicles is called moustache sign. Loss of moustache sign depicts seminal vessel infiltration.

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### ***Guideline statements for 'N' staging***

**Q: How does it matter whether nodes are involved or not?**

A; nodal involvements means systemic disease, thus only hormonal Rx(ADT) is the management

**Q: how will you detect pelvic LN.?**

A: any pelvic node  $\geq$  1 cm is presumed +ve (on CT scan)

**Q: suppose CECT scan pelvis suggests 12mm size L.N how will you proceed?**

A:

- FNAC of suspected LN is an option but is rarely done as pelvic L.N. are overlying blood vessels and are as such very difficult to access for biopsy..If +ve  $\rightarrow$  then hormonal Management
- 40% chances of being false negative as this LN may be inflammatory as pt may have developed UTI/Prostatitis , post TRUS biopsy.

**Q: what else can be done for such cases with suspected L.N.?**

A: See for corroborative evidences/factors

1. High PSA
2. High Gleason's
3. TRUS/MRI suggestive of advanced disease
4. TRUS Biopsy s/o Extensive core involvement

All these points suggest high chances of LN being +ve for tumour.

**Q: what recent advances in imaging can be used to see for positivity of an enlarged pelvic L.N.?**

A:

Prostascint	} if available should be done to see whether node is involved
MRI spectroscopy,	
MRI –Fermuxtran	

**Q: what else can be done to find out mets in a lymph node?**

A: FERMUXTRAN scanning - Iron oxide paramagnetic nanoparticles. These iron oxide nanoparticles are taken up by macrophages . These iron oxide particles are detected by MRI thus mets / & involved LM will have high signal Intensity on MRI

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**Guideline statements "m" staging**

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**Q: what is the relevance of raised Sr.  $\text{AlKPO}_4$ ?**

A: 70% of pts with raised sr.  $\text{AlKPO}_4$  will have +ve bone mets

Level of serum  $\text{AlKPO}_4$  is directly related to amount of bone mets.

**Q: what are the types of bone mets in Ca-P?**

A: Osteoblastic

**Q: What is the most sensitive method to detect bone mets?**

A: Bone scintigraphy = Bone scan

**Q: What is the radio pharmaceutical agent used for bone scan?**

A:  $^{99}\text{Tc}$  – labeled Bis –Phosphonate salts Methyl Di Phosphonate = MDP

Scan after 4 to 6 hrs after inj<sup>n</sup> of MDP.

**Q: what is the duration gap between bone scanning and radio-labeled injn?**

A: Bone scan is done 4-6 hrs after  $\text{TC}^{99}$  labeled Bis-Phosphonate I.V. injection

**Q: what is super scan?**

A: Super-scan → intense uptake of contrast into axial skeleton in cases of extensive mets ,so that even kidneys are not visualized.

**Q: what is the other highly sensitive method to detect bone mets?**

A:

- $\text{F}^{18}$  labeled PET /CT
- Prostatecint

**Q: what are the sites of metastasis in Ca prostate**

A: Bone > LN> Lung> Liver> Brain > Skin

**Q: Can PSA level correlate with metastatic status?**

A: Yes: PSA > + 100 ng/ml means metastatic disease

+Ve predictive value of PSA> 100 for mets is 100%

EAU <sup>2010</sup> Guidelines page 30

**Q: what are the conditions that can cause PSA rise above 100 ng/ml?**

A:

- ca prostate
- Acute Suppurative Prostatitis
- Immediate post TURP

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: will you do prostatic biopsy in a patient having PSA more than 100 ng/ml?**

A:

- as such there is no need as ca prostate is the only differential diagnosis in an otherwise healthy patient ( no h/o TURP or FEVER).
- But for medico legal purposes, for the purposes of insurance claims and patient satisfaction prostatic biopsy may be done in an otherwise healthy patient ( no coagulopathies, no cardiac risk factors etc.)
- EAU guidelines 2010 page 30 states that positive predictive value of PSA more than 100 is 100 % for ca prostate mets
- Please read... **The accuracy of the increased prostate specific antigen level (greater than or equal to 20 ng./ml.) in predicting prostate cancer: is biopsy always required?** Gerstenbluth RE J Urol. 2002 Nov;168(5):1990-3
- Please read ... **Identification of metastatic disease by T category, Gleason score and serum PSA level in patients with carcinoma of the prostate.** Rana A. Br J Urol. 1992 Mar;69(3):277-81.

**Q: what is the PSA value for doing Bone scan in asymptomatic patient?**

A: PSA > 20

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### ***Guideline statements- Radical Prostatectomy***

**Q: what comprises of intermediate risk group localized CaP?**

A: T<sub>2b</sub>, T<sub>2c</sub> / Gleason=7/PSA 10-20

**Q: what is the gold std Mx for intermediate risk group localized CaP?**

A: Radical Prostatectomy (+LN dissection)

**Q: what is special about management of T<sub>2b</sub> / T<sub>2c</sub> ?**

A:

- Radical Px Along with LN dissection
- No need for bone scan
- Almost no option for A/s of w/w

**Q: what group comprises high risk localized ca-Prostate?**

A: T<sub>3A</sub> or Gleason 8-10 or PSA>20

**Q: How will you stratify the Mx for high risk group?**

A:

- For T<sub>3A</sub>: EBRT/IMRT + ADT
- For T<sub>1</sub>-T<sub>2</sub> but Gleason's 8-10 or PSA>20 → Radical Px + ADT

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: suppose after Radical Prostatectomy, report comes as pN+ve, what will you do?**

A: Do PSA @ 8 wk post op check it is PSA < 0.1 mg/ml

Start ADT within 8 wks of Rad Px → improves OS/DSS/QOL Messing et al (messing Trial 2006.)

**Q: why is surgery discouraged during traditional Mx of T<sub>3A</sub> ?**

A: B'coz

- Increased risk (40%) of +ve surgical margins
- Much high chances of LN mets (40%)
- Much high chances of distant mets (40%)
- Overall survival doesnot improve with Surgery alone

Thus 40-60% pts will require an additional Radiation therapy or hormonal therapy or Both.  
use adj. ADT x 6 months for better outcome.

**Q: what are the chances of over staging the disease i.e cT<sub>3</sub> finally coming out to be pT<sub>2</sub> ?**

A: 20-30%

**Q: what is special about management of localized T<sub>2</sub> high risk CaP- Gleason 8-10, PSA > 20?**

A:

- Radical prostatectomy +extended lymph node dissection
- Chances of LN mets = 40%
- Bone scan is must
- Post op ADT is recommended

**Q: what is the role of adjuvant therapy in pT<sub>3</sub> or N+ve after radical prostatectomy report?**

A:

- For all pT<sub>3</sub> → give 64 Gy EBRT/IMRT
- For all p N +ve → give ADT/ hormone therapy
- (For pt with pN+ve → adj ADT improves OS upto 10 yr only , improves PFS & QOL.

---

## **Guideline statements for lymphadenectomy**

**Q: what is the Traditional Teaching for cN<sup>+ve</sup> ?**

A: No need for Radical Px , go straightaway for ADT

**Q: What is the traditional teaching for intra op frozen section being s/o +ve LN**

A: In Rad Px ; do lymphadenectomy first and send for frozen section

- If frozen section shows L.N +ve for mets then abandon the procedure.

**Q: What is the current guideline statement?**

A:

- To complete the radical prostatectomy, even if the LN are +ve on frozen section
- But if LN are +ve in pre op clinical staging cN<sub>1</sub> Then do not operate for Radical prostatectomy
- Engel & Bastian study : E urol 2010.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is eLND? What groups of LN are removed?**

A: HOPE

Hypogastric	}	(Internal iliac)
Obturator		send all LN groups in separate packet (Bouchner's regimen)
Pre sacral		
Ext iliac		

**Q: what is the expected number of LN removed in HOPE group?**

A: roughly around 20 L.N.

Atleast 20 L.N. should be removed to declare pN<sub>0</sub>.

**Q: what are the chances of LN involvement in Localized CaP?**

A: low risk	< 7 %	}	No need for LN dissection
Intermediate risk	20-25%		plz do L.N. Dissection
High risk	40%		

**Q: what are the complications of L.N. Dissection (LND)?**

A:

- Lymphocele, Lymphedema
- DVT/ PE
- Injury to Blood vessel/ nerves
- Increase operative time / increase anesthesia time.

**Q: Is there any role for neo adj Hormonal therapy before radical prostatectomy espl in cT<sub>3</sub> / cT<sub>4</sub>?**

A: Interesting & lucrative concept but of No use .No Benefit in OS/DSS/ mets free survival.

**Q: Is there any role for adjuvant hormone therapy after Rad Prostatectomy?**

A:

- Yes, Definite benefit in pts who receive adjuvant hormonal therapy
- Cancer free survival / DSS both are significantly improved
- Although overall survival advantage is not there beyond 10 yrs.

**Q: what are the major complications after Rad Px?**

A:

- Mortality 2%
- Urinary fistula 4%
- Urinary incontinence (beyond 1 yr) 8%
- Impotence 90% - 100% (if non-nerve sparing op<sup>n</sup>)

**Q: what are the EAU guidelines contra-ind<sup>n</sup> for doing nerve sparing Radical Prostatectomy?**

A:

1. cT<sub>3-4</sub>, cT<sub>2c</sub>
2. Gleason score > 7
3. Intra-op Risk of leaving +ve surgical margin
4. Pre op neurovascular invasion on biopsy



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the famous Engel & Bastian study?**

A: Engel & Bastian E-urol 2010

- Centre:- Munich cancer registry
- Type → retrograde prospective trial
- Time duration – 1988 to 1007
- Methods → 1414 pts were found have N+ve intraop
  - in 456 Rad Prostatectomy was abandoned
  - in 958 rad Prostatectomy was completed.

Results: Pts with completed Radical Prostatectomy has better DSS & QOL & O.S in comparison to those having abandoned R.P.

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### ***Guideline statements for radiation therapy for Ca P***

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**Q: In general how is the effect of Radiotherapy in comparison to radical prostatectomy?**

A:

- Oncological effects is same
- Overall survival is same
- QOL is better with Radical Px
- Fl/up is better controlled with radical prostatectomy

**Q: what are the ind<sup>n</sup> for giving radiotherapy in localized Ca-Prostate?**

A:

1. Pt denying Sx
2. Pt not fit for Sx
3. Life expectancy < 10 yr

**Q: what is the famous Michel Bolla study?**

A: All pts undergoing EBRT/IMRT should get adjuvant ADT, as adj. ADT improves O.S, D.S.S. and QOL.

**Q: how will you stratify radiotherapy for localized ca-prostate?**

A:

- T<sub>1A</sub> to T<sub>2A</sub> / Gleason < 6 / PSA < 10 → Radiotherapy only (risk of L.N involvement is less than 7%)
- T<sub>2B</sub> / Gleason 7 / PSA > 10 → Radiotherapy (74 Gy)+ADT (6 months)--(risk of L.N involvement = 25%)

**Q: For how long will you give this ADT along with Radiotherapy?**

A:

- Minimum 6 months (short course ADT)
- Ideally 3 yrs ( EORTC-Trials)

**Q: what is the dose of Radiotherapy given?**

A: Minimum 74 Gy . EBRT

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What is the adv of IMRT?**

A: with IMRT total dose of Radiotherapy can be escalated upto 86 Gy (or atleast more than 80 Gy) with minimum toxicity to side organs.

- Better tumour oncological control
- Less side effects

### **Q: what is the Technical problem with IMRT?**

A;

- To keep track of organ movement during therapy
- Fiducial markers are used to track organ movements
- IGRT = image guided Radiotherapy

### **Q: In EBRT / IMRT; of which particle the radiation beam is made up of?**

A: Photon (not proton)

### **Q: what is the problem / dis adv of photon beams?**

A:

1. Photon beams irradiate all tissues that fall in their path
2. Post target fall off is very slow; those organs which fall on the opposite side of target also get irritated
3. Where as in proton Beams; the proton beam deposit most of its irradiation energy in target and does not irradiate pre-target / post-target soft tissues.

### **Q: what is 'Bragg Peak' effect?**

A: In proton radiation when all the energy is deposited at the target organ, it is called Bragg- Peak.

### **Q: what is the current status of proton beam therapy ?**

A: Experimental / Expensive.

### **Q: what are 'RECIST' criteria?**

A:

- Response Evaluation Criteria In Solid Tumours
- these are set of published rules which define whether tumours (solid tumours) are responding/stabilized/deteriorating.

### **Q: what is the role of adjuvant radiotherapy after Rad Px**

A: Adjuvant radiotherapy can be given to

- ➔ cT<sub>2</sub> which have come pT<sub>3</sub> on Biopsy
- ➔ +ve surgical margins
- ➔ Gleason 8-10 (poorly differentiated tumours)

### **Q: what is the gain of giving adjuvant radiotherapy?**

A: OS, DFS, cancer free survival is improved .CFS 80% @ 5 years

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: If in an adjuvant setting (after radical prostatectomy) EBRT / IMRT is planned to give; which is better option-?**

1. To give EBRT/IMRT immediately or-
2. To keep pt on w/w and give EBRT as PSA rises.

A: Give EBRT immediately as soon as urinary control is gained.

**Q: what are the current concepts in treating locally advance cT<sub>3</sub> N<sub>0</sub>M<sub>0</sub>?**

A: for T<sub>3</sub> Radiotherapy is the treatment of choice as rates of surgical +ve margins are high 40% (EORTC study)

- As chances of L.N Mets are high (40%) hormonal therapy is also must → Michael Bolla et al
- ADT is to be started along with radiotherapy
- Best results are seen if ADT is given for 3 yrs
- Michel bolla study.

**Q: What is the duration of ADT?**

A: for all pts getting primarily treatment with radiotherapy gives ADT for 3 yrs

For all pts pN+ve after primary radical prostatectomy give 3 yrs of ADT.

## **Guideline statements for Hormonal therapy**

**Q: what is ADT?**

A: Any treatment that results in suppression of androgen activity is referred to as androgen deprivation therapy.

**ENZALUTAMIDE XTANDI<sup>R+</sup>**

Drug: Enzalutamide , (= MDV-3100) XTANDI<sup>R</sup>

Type : Dual analogue peripheral androgen recp blockers & Transcript modifier

Action:

1. Blocks binding of Testosterone to androgen recp
2. Prevents activated AR to reach nucleus & getting being transcribed

Available as : 40 mg capsules.

Dose: 160 mg/OD (=40mg x 4 capsules) (with /without food)

Indn: Metastatic CRPC who have previously Received Docetaxel

ADR: Fatigue, malaise, backache, headache

Diarrhea, hot flashes

Neutropenia; rise in Bilirubin .increase altered LFTs

Trial : Based on AFFIRM Trial

Placebo v/s Enzalutamide in pts with Docetaxel failure: - survival improved by 5 months in enzuatamide arm.

PREVAIL Trial . Now ongoing ; checking Enzalutamide in pts who are chemo naïve.

Cost: \$7500 dollars per month



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the normal level & castration level of Testosterone?**

A: normal level above- 300 ng/dl  
Castration level < 20 mg/dl

**Q: what is the castration level achieved after Ox**

A: within 12 hrs EAU Page-84

**Q: How does DES (Estrogen) acts?**

A: DES

- Can suppress the LHRH secretion from hypothalamus
- Can suppress the LH secretion from Ant pituitary
- Suppress the LH action on Leydig cells and thus suppress Testosterone release
- Suppress the action of Testosterone on prostatic cells.

**Q: what are the side effects of DES?**

A: Cardio toxicity, Thrombo-embolic events

**Q: why is DES cardiotoxic?**

A: DES has high first pass Hepatic Metabolism

The metabolic end products are highly thrombogenic

These end products lead to formation of Thrombi & Micro-thrombi which lead to MI & Other cardiac events.

**Q: what is the present recommended dose of DES?**

A: 1 mg /day or less

Honvan= 120mg tablet oral, HONVAN → Fosfestrol is an inactive synthetic estrogen which converts to 1 mg equivalent DES in body

**Q: how can Cardiotoxicity of DES be prevented?**

A: Low dose DES

Par-enteral DES – Skin patch, - I.V. / i.m.

Give low dose aspirin 75 mg/day } to counter the thrombotic effects  
Low dose warfarin 1 mg/day }

**Q: Why is there re-newed interest in DES?**

A:

- Even LHRH analogues have side effects
- DES has shown promising results in CRPC patients
- A new estrogen receptor (ER-P) has been found responsible of tumourogenesis
- DES does not have cognitive and Bone side effects.

**Q: what is the mechanism of action LHRH agonists?**

A: they increase the serum conc<sup>n</sup> of LHRH.

Continuous raised levels of LHRH leads to down regulation of LHRH reception thus decrease LH, decrease FSH, levels and eventually decrease T levels.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is flare up phenomenon?**

A: The initial rise in Testosterone levels after LHRH analogues lead to disease progression and increased symptoms, this is called flare up phenomenon.

Flare up phenomenon can occur starting from 2-3 days of LHRH analogues injn. & upto 28 days.

### **Q: How can flare up phenomenon be prevented?**

A:

- Add Calutide 50 mg /OD for 28 days post injection, starting a few days 5 -7 days before injection
- Use LHRH antagonists

### **Q: what % of metastatic Ca-Prostate can have flare up phenomenon?**

A: Only 5-10 % pts of metastatic CaP have flare up phenomenon

### **Q: what are the components of flare up phenomenon?**

A:

1. AUR
2. Bone pain
3. Cord compression (spinal)
4. DIC

### **Q: What is the m/c LHRH agonist used?**

A: Leuprolide acetate 22.5 mg/i.m. stat depot for 3 months cost of Rs. 10000/ inj<sup>n</sup>

### **Q: after what time Testosterone levels will reach castration levels, after giving LHRH agonist /luprolide?**

A:

- 2-4 wks : to reach levels T < 20mg/dl
- 10-20% failure to reach castration levels
- 4-6 wks for PSA to decline.

### **Q: what are the adv of LHRH agonists/antagonist against surgical castration?**

A:

- reversible
- Option for intermittent blockade
- No psychological trauma of losing testicles
- No operative morbidity

### **Q: In the era of LHRH agonists what are the indn for Bilateral orchidectomy?**

A:

- Impending spinal cord compression (do O<sub>x</sub> under L/A)
- Impending long bone fractures
- Inco-operative Pt/ not available for fl/up
- Cost factor

### **Q: What are the names of LHRH antagonists?**

A: Abarelix, Degarelix , Cetrorelix.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are advantages of LHRH antagonists?**

A: They don't cause flare up Phenomenon

Useful for impending cord compression/ fracture

**Q: what is the time needed to reach castration levels Testosterone?**

A: after LHRH antagonists-

- Castration level Testosterone reaches by 3<sup>rd</sup> day and PSA declines by 14-21 days
- After LHRH agonist –
- 2-4 wks. For Testosterone to reach castration levels and 4-6 weeks for PSA decline.

**Q: what are the m/c side effects of LHRH antagonists?**

A:

- Monthly inj<sup>n</sup> available in India- Degarelix
- Painful inj<sup>n</sup>
- Histamine related side effects

**Q: what are the types of Anti androgens?**

A:

Steroidal	Non steroidal
Competitive blockade of AR	Competitive Blockade of AR
Centrally action - lead to decreased T levels	Maintained normal T or even elevated T
Dual action decrease	Leads to Gynecomastia, Mastodonia
Cause decrease LH, decrease T, thus libido loss, ED	Lesser libido loss, ED
Eg. Cyproterone acetate	Eg. Flutamide, Bicalutamide

**Q: what is the dose of cyproterone acetate?**

A: 100 mg / TDS

**Q: what are the other steroidal agents?**

A: Megesterol acetate

Medroxy-progesterone acetate

Honvan → Fosfestrol

**Q: what are the examples of non steroidal anti androgens (NSAA)?**

A:

- Nilutamide
- Flutamide
- Bicalutamide
- Enzalutamide

**Q: what are the m/c side effects of NSAA?**

A: Breast pain, Gynecomastia, Hot flashes

Hepatotoxicity → Liver enz & LFTs should be normal before starting NSAA

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the difference b/w Flutamide & Bicalutamide?**

A:

- Both have equal efficacy
- But Calutide has very less toxicity & better patient compliance
- Flutamide is 250 mg / TDS
- Calutide is 50 mg/OD → better compliance
- Flutamide is a prodrug → half life of active metabolic is 5 hrs so Flutamide is given TDS.

**Q: what is the present status of Antiandrogen?**

A:

1. As part of complete androgen blockade CAB( which itself has become rare, other than preventing Flare up phenomenon)
2. As part of minimal androgen blockade
3. As part of stepwise androgen blockade
4. As part of androgen withdrawal syndrome.

**Q: what is the current status of complete androgen blockade?**

A:

- According to Cochrane meta analysis /LANCET/ EAU/ Michel Bolla
- Benefits of CAB in only 5% and that too after 5 yrs
- Side effects of CAB is more
- Hence CAB should not be used routinely.

**Q: what are the present guideline statements about hormonal therapy for Ca-Prostate?**

A:

- ADT / Hormonal therapy decreases the progression of disease at each stage.
- From Node +ve → asymptomatic metastasis → symptomatic mets → compl<sup>n</sup> all the stages are delayed
- ADR /HT thus not only decreases progression but it also increases CFT, DSS, & O.S

**Q: how can you treat hot flushes?**

A:

- Hot flushes is m/c side effects 50-80 %
- Appear after 2-3 days months of ADT
- Progesterone based treatments are effective Eg., Megesterol, DES ,Medroxy-progesterol  
Cyproterone acetate
- Antidepressants – Venlafaxine 12.5 mg/day and Sertaline are also effective.
- Venlafaxine is inferior to hormonal agents.

**Q: what is the present statue of intermittent androgen blockade (IAD)?**

A: NEJM – April 2013 → 20% more risk of death in IAD

Sexual benefits & QOL benefits are short lived for 3-6 months only

It is better not to give IAD.

**Q: what are the effects / side effects of Zolendronate?**

A: effects → BMD increase by 10% at the end of 1 yr

Side effects → Jaw necrosis, Hypocalcaemia, Gastritis, GERD, Oesophagitis



---

**Guideline statements for fl/up**

**Q: what is the expected PSA nadir?**

A: after Rad Prostatectomy: 0.2 ng/ml  
After Radiotherapy → less than 0.5 ng/ml

**Q: what will you do PSA after Rad Px?**

A: 6-8 wks (PSA should be undetectable by 6 wks)

**Q: how will you define failure after Radical Px?**

A: Two consecutive PSA values of more than 0.2 ng/ml.

**Q: How will you define failure after Radiotherapy?**

A: Astro-phoenix criteria  
Rise of 2 ng/ml above the nadir value  
Applicable to all Pts → treated with radiotherapy +/- ADT.

**Q: Can PSA failure type give an idea about local recurrence v/s mets?**

A: early failure + rapidly increasing PSA = mets  
Late failure + slowly rising PSA = local recurrence.

**Q: what are the routine components of fl/up after definitive Px?**

A: PSA + DRE; - must @ 3 months, 6 months, 12 months  
@ 6 months for 5 yrs  
@ then annually lifelong.

**Q: What is the role of TRUS → Biopsy / Bone scan in fl/up?**

A: if PSA is raised → TRUS  
If suspected nodule on DRE → TRUS with Biopsy  
If bone pain / symptomatic / Rising PSA = Bone scan

**Q: In patients of Metastasis (or on ADT) what other blood investigations would you like to do?**

A:

- Sr. creatinine : for upper tract dysfunction
- LFTS : for liver involvement  
Hepatotoxicity by Non steroidal anti-androgens
- Sr. AlkPO<sub>4</sub>: for Bone mets.
- HB: to see for anemia – due to Bone marrow depression.  
or due to ADT.

**Q: what is the status of Complete Androgen Blockade (C.A.B.) v/s only androgen LHRH agonist?**

A: Only 5% survival benefit after 5 yrs in patients receiving CAB but side effect are more and QOL is poor.  
Present status of CAB is doubtful/ not needed.( EAU -2013 / Cochrane meta analysis / LANCET.)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the status of intermittent androgen Blockade?**

A:

- The largest Trial SEUG (South European Uro-onco Group) (n=766) it as suggested that overall survival is same in both cont. ADT v/s intermittent ADT, but QOL is better in IAD.
- Recent analysis says IAD has poorer outcome than continuous ADT.
- NEJM – April 2013 → 20% more chances of death with IAD in comparison to continuous ADT.

### **Guideline statements about Biochemical failure**

**Q: what % of Patients will have biochemical failure after Rad Prostatectomy or Radiotherapy?**

A: 25% - 50% pts will have PSA failure

**Q: who describe that Biochemical failure is must before clinical recurrence?**

A: Pound et al

**Q: what is the PSA failure level after RAD Prostatectomy?**

A: Two consecutive values of 0.2 ng/ml or more

**Q: what is the PSA failure value after Radiotherapy?**

A: Any value of "Rise of 2.0 ng/ml above nadir". Irrespective of value of nadir  
Irrespective of hormonal treatment is given or not

**Q: what are the chances of local relapse after Rad Prostatectomy?**

A: 40-50% (for T<sub>2b</sub>/T<sub>2c</sub>) chances increase with T<sub>3</sub> (EORTC)

**Q: what is the relevance of PSA – DT w.r.t site of recurrence?**

A: PSADT < 04 mo → mets

PSADT > 12 mo → local recurrence.

**Q: How will you define local recurrence after Radiotherapy?**

A: ideally there should not be any live/viable tumour cells after 18 months

Finding of live /viable tumour cells on prostatic biopsy even after 18 months → failure.

This should accompany with PSA rise and no other mets on imaging.

**Q: what are the factors indicating local v/s system relapse?**

A:

Factors	Local relapse	Systemic relapse
PSA failure time	>3 yrs	Within 1 yr
PSA DT	>12 mo	< 4 mo
Original Gleason's	<6	8-10
Original stage	T <sub>1</sub> -T <sub>2</sub>	T <sub>3</sub> and above

## **Neeraj Sharma's ...Notes For Urology Practicals**

Prediction value is 80% correct.

**Q: Do you do prostatic Biopsy routinely after primary Radiotherapy?**

A: No, only if in rising PSA, with no demonstrable mets on imaging or new suspected nodule on DRE.





***Neeraj Sharma's-***  
**NOTES FOR UROLOGY PRACTICALS**

**Cystic diseases of kidney-pediatric**

**Q: what is ARPKD?**

A: Autosomal recessive polycystic kidney disease

**Q: What is the age of presentation?**

A: usually at birth, 0-1 yr  
Incidence 1 in 10,000

**Q: What is the type of inheritance of ARPKD?**

A: Autosomal recessive  
1 in 4 children will be affected

**Q: what are the systems involved in ARPKD?**

A: renal → Bilateral symmetrically enlarged kidney  
Hepatobiliary → hepatic fibrosis, Biliary dysplasia

**Q: what is the chromosome /gene / protein involved in ARPKD?**

A: Chromosome -6  
Gene – PKHD-1 (polycystic kidney & Hepatobiliary dysplasia gene)  
Protein involved = Polyductin = fibrocystin

**Q: what are the clinical presentations of ARPKD?**

A:

Before birth, ante natal ultrasonography will reveal

- B/L enlarged kidneys
- Hyper echoic kidneys
- Oligohydroamniotic

During delivery

- Difficult vaginal delivery due to large abdomen of fetus

At birth

- Potter facies
- Deformed lower limb (Bow & clubbed legs)
- Respiratory distress
- Genital abnormality → undescended testis, small penis

Later in life

- Jaundice
- Hepatic dysfunction

**Q: what are the components of potter facies?**

A:

- Prominent inner canthal folds (most imp)
- Recessive chin
- Low set ears
- Blunted nose
- Prominent depression b/w lip & chin

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Is there any association b/w ARPKD & RCC?**

A: no

**Q: What are the investigations required and their findings?**

A: USG → B/L large kidney

B/L hyper echoic kidney

Renal scan → non function / poor function

Renal f<sup>n</sup> → raised serum creatinine / blood urea

LFT - ↑ raised

**Q: What is the Treatment of ARPKD?**

A: no cure

---

## **Autosomal Dominant Polycystic kidney disease ADPKD**

**Q: what are the chromosomes/Genes/ proteins responsible for ADPKD?**

A: gene	chromosome	protein
PKD-1	Chr-16	polycystin 1
PKD-2	chr-04	polycystin 2

**Q: what is the inheritance and penetration of ADPKD?**

A: Inheritance is autosomal dominant, 2 out of 4 will be affected

Penetration is 100%

**Q: what is the incidence of ADPKD?**

A: 1 in 400 to 1 in 1000

**Q: what are the other extra renal manifestations of ADPKD?**

A: Cysts of liver, pancreas, spleen, lungs

intracranial aneurysms / aortic aneurysm

Colonic Diverticulae

Mitral valve prolapse

**Q: what is the continuous Gene syndrome?**

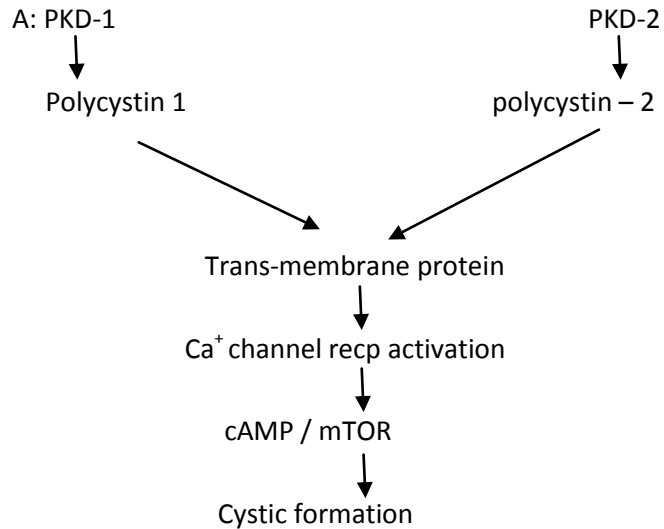
A: It is the syndrome arising due to deletion of multiple gene loci, which are adjacent to each other

- Multiple gene defects produce Unrelated clinical features
- Eg. PKD-1, & TSC-2 gene both are on Chr 16, so deletion of this specific portion of chromosome 16 will lead to manifestations of both diseases



## Neeraj Sharma's ...Notes For Urology Practicals

**Q: what is the pathogenesis of ADPKD?**



**Q: what are the types of ADPKD?**

A;

factors	ADPKD-1	ADPKD -2
Gene	PKD-1 on chr 16	PKD-2 on chr 4
Incidence	85%	15%
Progression	More rapidly progressive	Slow progressive
Cyst appearance	Cysts start appearing by the age of 10yrs 90% of pts will have cysts by age of 20 yr 100% pt will have cyst by 30 yr	100% of pts will have cyst by the age of 40 yrs
ESRD	ESRD occurs @ 50 yr	ESRD occurs @ 70 yr

**Q: what are the clinical manifestations of ADPKD?**

A: Pt becomes symptomatic @ 30-40 yrs age

- HTN hypertension (80%)
- Hematuria – Gross, } 50%
- Microscopic }
- Flank pain: due to abd mass (50%)
- G.I symptoms : secondary to compression
- Renal colic → clots, stones

**Q: what types of stones are a/w ADPKD?**

A: Stones (30%) → calcium oxalate, uric acid

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What is the cause of HTN in ADPKD?**

A: Hypertension (70% - 80%), Renin mediated, due to compression of normal renal parenchyma by cysts.

### **Q: what are the important findings in clinical examination of ADPKD?**

A: HTN: young pt with HTN (20 – 30 yrs age)

: Severe HTN

: Rise in diastolic BP is the rule

Phy examination: B/L large palpable kidneys (rule)

: Palpable liver (+/-)

Palpable Spleen (+/-)

### **Q: what are the extra renal manifestations of ADPKD?**

A:

Hepatic cysts (on USG) → Most common (M/C )

→ a/w PKD -1 & PKD-2 both

→ occurs in 100% pts by age of 50 yrs

→ affected by estrogen, so large cysts in females

Intracranial Aneurysms

→ aneurysms of circle of Willis (Berry aneurysm)

→ leads to subarachnoid hemorrhage

→ a/w PKD 1 > PKD2

→ less than 1 cm → less risk of rupture

→ family H/O of rupture → more chances of rupture

Cysts of.... pancreas, spleen, (5%)

Seminal vesicles (40%)

Mitral valve prolapse (<5%)

Colonic diverticulae (<5%)

### **Q: what is the risk of RCC in ADPKD ?**

A: No specific relation

Risk is equal to general population

### **Q: What is the gross appearance of kidney in ADPKD?**

A: Bilaterally Huge kidneys (>15cm)

Bilaterally multiple cysts with thinned out parenchyma

Maintains reniform shape

### **Q: What is important in history taking?**

A: Ask the history for atleast 3 generations

Ask or HTN /stroke/ renal disease/ renal transplant

### **Q: What are the USG criteria for ADPKD?**

A: USG criteria for ADPKD is devised by **RAVINE** (RAVINE et al, 1994)

- Holds true for 100% ADPKD - 1

- Holds true for 60% ADPKD – 2

## **Neeraj Sharma's ...Notes For Urology Practicals**

AGE

0-30 yrs..... – atleast 1 cyst in each kidney (or 2 unilateral)

30-60 yrs..... – atleast 2 cyst in each kidney

60yrs – above..... – Atleast 4 cysts in USG each kidney

**Q: What is ADPKD –x?**

A: patient of ADPKD in which type 1 or 2 is not yet identified.

**Q: What is the USG criteria for ADPKD-x ?**

A: ADPKD-‘x’ is a person with family history +ve for ADPKD, but unknown genotype

**‘Pei’ Criteria**

15-40 yrs → at east 3 cysts either Unilateral or bilateral

40-60- yrs → atleast 2 cyst in each kidney

60-above → atleast 4 cyst in each kidney

**Q: What are the USG criteria for ADPKD – 2**

A: Same as or ADPKD-‘X’

**Q: what are the USG criteria for EXCLUSION of ADPKD in a person?**

A: for ADPKD 1; No cyst in persons above 30 yrs

for ADPKD 2 and ‘x’: No cyst in person above 40 yrs age

Thus for any person above the age of 40 yrs; with no renal cyst / or one simple cyst means he does not have ADPKD (any type)

**Q: what are the differential diagnoses for ADPKD?**

A:

- multiple simple cysts
- Acquired renal cystic disease
- Medullary cystic disease
- Orofacial digital syndrome
- Tuberous sclerosis
- VHL

**Q: What are more sensitive radiological means to diagnose a cyst ?**

A: CT scan & MRI

**Q: What are the management goals of ADPKD?**

A: Slow down the progress towards renal failure

Control HTN

Control hematuria

Treat UTI

Treat abdominal pain

Correct metabolic complications

**Q: What is the dietary advice given in ADPKD?**

A: Low fat, low salt diet

Low protein diet

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you control HTN in ADPKD?**

A:

1. ACE inhibitors-Captopril, enalapril, Lisinopril
2. ARBs( Angiotensin Recp Blockers)-Telmisartan, Losartan

**Q: How will you control infection in ADPKD?**

A: Gram negative bacteria are usual culprits

Antibodies should have good Cyst-penetration

Cyst-penetrating antibiotics -Ciprolaxin, Clindamycin, Chloramphenicol, Cotrimaxazole, Carbapenams

**Q: How will you control hematuria in ADPKD ?**

A: Bed rest and copious hydration

**Q: How can you control abdominal pain in ADPKD ?**

A: DO not use NSAIDS

Try tramadol

Use Rovsing's de-roofing operation

**Q: What is the latest in ADPKD Mx?**

A: long acting somatostatin analogues (Octreotide) are nephroprotective in ADPKD.

Sandostatin LAR → Brand name of octreotide, dose 20 mg ,cost Rs 650/-



**Q: what is the age of ESRD in ADPKD?**

A: ADPKD -1 → 50 yrs

ADPKD- 2 → 70 yrs

**Q: How will you select donor for ADPKD Patient?**

A: Enlist all the willing donors

Wife → Blood group match → accept

Blood related/siblings → needs screening for ADPKD

**Q: What are the genetic Tests available for ADPKD?**

A:

1. Linkage analysis: L.A uses microsatellite markers that flank PKD 1, 2 genes
2. Direct DNA analysis → using liquid chromatography

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: How will you select donor for k/c/o ADPKD-1?**

A: If Recipient is a k/c/o ADPKD- 1

Blood related donor will also have ADPKD 1

Step 1 – enlist all siblings / parents of age above 30yrs

Step 2- screening USG

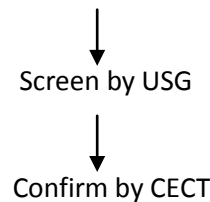
- Shortlist all who have no cyst above 30 yrs
- Shortlist all who have maximum 1 cyst between 30 -40 yrs
- Donor **cannot** be less than 30 yrs old
- Sex of the donor does**not** matter

Step 3 – of all the short listed candidate after USG

- Do CECT scan or eligible donors
- Confirm that there is no cyst that is being missed on USG
- Rule out other renal pathological like stone, RCC, Adenoma, parenchymal disease

### **Q: What is the donor selection process for a K/C/O ADPKD – 2 or ADPKD- 'X'?**

A: enlist all willing donors of age > 40 yrs



### **Q: What is the status of genetic screening for donor selection in ADPKD?**

A: Genetic study analysis is done

1. If donor wishes to confirm his status
2. Equivocal USG/CT/MRI/ findings

### **Q: what is the current status of Native nephrectomy (NNx) in a case of ADPKD?**

A:

- In routine NNx is not indicated
- Only 20% of ADPKD patient require NNx
- It may be more harmful to do NNx

### **Q: what are the indications for doing NNx?**

A:

- Recurrent infection
- Intractable pain
- Severe GIT compressive symptoms
- Intractable hemorrhage
- Suspected malignancy
- To provide space for Transplanted kidney

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the disadvantages of doing NNx? Or what are the advantages of maintaining native kidneys?**

A: Advantages of maintaining native kidneys are

AVOIDING of

- Fluid overload
- CHF
- Pulm oedema
- Hyperkalemia
- Anaemia
- Renal osteodystrophy

**Q: Why does ADPKD patient doesnot have anaemia ?**

A: Due to raised erythropoietin secretions

**Q: what is the ideal time for doing NNx?**

A: At the same sitting with renal Transplant

---

## **MCDK**

**Q: what is MCDK?**

A: Multi Cystic Dysplastic kidney

**Q: what are the two types of MCDK?**

A:

1. Infundibulopelvic type → atresia involving renal pelvis & ureter (more common type)
2. Hydronephrotic type → only upper ureter is atretic

**Q: Is MCDK unilateral or bilateral?**

A: U/L

B/L is not compatible with life

**Q: What are the hall mark features of MCDK?**

A: Multiple cysts – varying sizes

- Throughout parenchyma
- Non communicating

Ureter is atretic

Dysplastic tissue in between cysts

**Q: what is the pathogenesis of MCDK?**

A: failure of ureteric bud to fuse with kidney

**Q: what is the typical MCDK kidney appearance?**

A: like a Bunch of grapes

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What are the clinical features of MCDK kidney?**

A:

- Abdominal lump / mass (0-2 yrs)
- Small dysplastic kidney with contra lateral normal kidney (MCDK involutes 2 yrs onwards)
- HTN
- UTI

**Q: What are the defects in contralateral kidney?**

A: PUJ Obstruction – 10%

VUR- 20%

Ipsilateral VUR → 50%

**Q: What is the USG appearance of MCDK?**

A: Haphazard distribution of cysts throughout the kidney with No central cyst

- No visible communication b/w cysts

**Q: How will you confirm the diagnosis?**

A: DTPA / DMSA will reveal non functioning kidney for MCDK

**Q: how will you treat MCDK?**

A: Spontaneously involutes

No need to intervene

---

## **NEPHRONOPHTHISIS**

**Q: what is the meaning of Nephronophthisis?**

A: nephron → Nephron

Ophthisis → Washing away / atrophy

Nephronophthisis → wasting of nephrons

**Q: What are the genes involved in Nephronophthisis?**

A:

- NPH 1 → m/c → Chromosome 2
- NPH 2
- NPH 3
- NPH 4

**Q: What is the inheritance type?**

A: Autosomal recessive

1 in 4 will be affected

**Q: What are the histological features of Nephronophthisis?**

A:

1. Thickening of glomerular membrane
  2. Diffuse intestinal fibrosis
  3. Cysts originate from DCTs
- 1 & 2 → leads to loss of urine concentrating ability & polyuria, polydypsia and CRF

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the age of presentation?**

A: 5-7 yrs

**Q: What are the presenting complaints?**

A: Severe anaemia

- Polyuria
- Polydypsia
- Renal Osteo dystrophy
- HTN

**Q: what is the mean age for ESRD in Nephronophthisis?**

A: 12 yrs for NPH -1

**Q: What are the extra-renal manifestations of NPH?**

A:

- Retinal degenerations
- Liver fibrosis
- Skeletal fibrosis
- Mental retardation

**Q: what is the difference b/w NPH & medullary cystic kidney disease?**

	<b>NPH</b>	<b>Medullary cystic kidney disease</b>
<b>Inheritance</b>	Autosomal recessive	Autosomal dominant
<b>Onset</b>	very early	late
<b>ESRD</b>	in teen ages	in adult
<b>Extra renal involvement</b>	+	- negative
<b>Symptoms</b>	Anaemia ,HTN, polyuria, Polydypsia	same but of mild degree
<b>Signs</b>	Proteinurea	mild degree
<b>Mx</b>	Transplant need at early age	Transplant at adult age

**Q: How is the diagnosis of NPH made?**

A:

USG → s/o medullary cysts

-Loss of cortico-medullary differentiation.

Biochemical – Protein urea

-↑ serum Creat, ↑ K<sup>+</sup>



## **Neeraj Sharma's ...Notes For Urology Practicals**

Biopsy: - Interstitial fibrosis  
-Thickened basement membrane

Genetic studies → mutations of NPH gene

**Q: what is the definitive Mx of NPH?**

A: Renal transplantation  
Disease doesnot recur in Transplanted kidney

---

### **TUBEROUS SCLEROSIS**

**Q: what is the other name of T.S?**

A: Bourneville disease

**Q: What is T.S?**

A: Tuberous sclerosis is an autosomal dominant disease arising due to mutations of TSC genes and characterized by benign growths called hamartomas in all organs of the body

**Q: What is TSC triad?**

A: Epilepsy  
- Mental retardation  
- Adenoma sebaceum

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the genes responsible?**

A: TSC -1 on Chr-9  
TSC-2 on Chr 16

**Q: what is the protein involved?**

A: TSC – 1 → Hamartin  
TSC -2 → Tuberin

**Q: What is the pathogenesis of TSC?**

A: Both TSC – 1 & TSC-2 are tumour suppression genes and mutations lead to tissue overgrowth and hamartoma formation

Both Tuberin & Hamartin play an important role in controlling mTOR pathway. Faulty production of Tuberin & Hamartin leads to tuberomas and hamartomas.

**Q: What are the major and minor features of TSC?**

A:

Major

- Renal AML
- Facial angiofibrosis
- Ungual fibroma (finger nails)
- Hypomelanotic macules
- Shagreen patch
- Cortical tuber (radiological mri finding depicting tubers in cerebral cortex = cortical tubers)

Minor

- Renal cyst
- Rectal polyp
- Retinal achroic patch
- Bone cyst

**Q: how many criteria are required for diagnosis?**

A: 1 major or 2 minor

**Q: What are the presenting features of TSC?**

A:

- Epilepsy
- Mental retardation
- Adenoma sebaceum
- HTN

**Q: What are the renal involvements in TSC?**

A: Renal involvement is second only to brain involvement

- AML- 40-80%
- Renal Cyst → 20-40%
- RCC → 2%
- HTN

**Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is adenoma sebaceum?**



**A: These are firm, discrete brown patches**

**Q: what is “ash leaf” appearance?**



**A: an early stage skin lesion**



**Shagreen patches**

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is the specialty about AML in TSC?**

A: Bilateral  
Multiple  
Appear by age of 10 yr  
Potential for hemorrhage / mass effect  
Causes HTN

} usually < 4 cm but large also

### **Q: what are the specialties of renal cyst?**

A:

- Manifest by age of 3 yrs
- HTN
- Multiple, B/L cysts
- Mimic ADPKD

### **Q: What is the RCC association with TSC?**

A: nothing more than 2-3%  
-clear cell

### **Q: what radiological investigations are needed?**

A:  
USG for renal cyst, renal AML  
CT scan  
MRI-head  
Skin lesion – biopsy  
Genetic evaluation

### **Q: What are the urological management principles of TSC?**

A: For urologist  
AML < 4 cm → wait & watch  
AML > 4cm → excise

- Symptomatic
- Bleeding
- Female of child bearing age

} excise

Management of HTN → ACE inhibitors

Management of Renal cyst → follow up

Management of Renal failure → renal Transplant

→ NNx should be done before Transplant as there is high risk of bleeding in native kidneys

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***Cystic Nephroma***

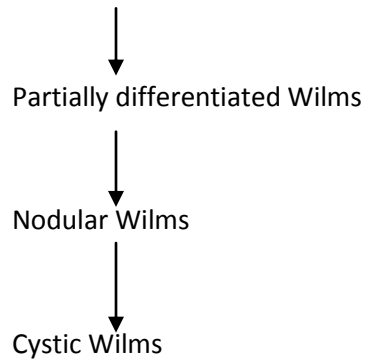
**Q: what is cystic nephroma?**

A: It is a benign tumour arising from nephrons, grossly it appears as a cystic mass, thus cystic nephroma (c/f adenoma is a solid mass)

**Q: Is cystic nephroma truly benign?**

A: Cystic nephroma is at the benign end of a continuous spectrum

Cystic Nephroma



**Q: What is the age of presentation?**

A: Bimodal presentation

Before 4 yr → male

After 30 yr → females

**Q: what are the presenting features?**

A:

**Child**

Abdominal mass

**Adult**

abdominal mass, Pain, Hematuria

**Q: What radiological investigations are needed for cystic nephroma?**

A: USG Abd and CECT Abd

**Q: what is the management of cystic nephroma?**

A: Partial Nx or Complete Radical nephrectomy

## **Medullary sponge Kidney**

**Q: what is medullary sponge kidney (MSK)?**

A: Medullary → Pertaining to renal medullar

Sponge → due to multiple cyst

MSK → is characterized by multiple cysts strictly confined to medullary region

**Q: what is the characteristic hall mark of MSK?**

A: Tubular dilation of the distal portion of collecting ducts; which gives an appearance of Bristles on a brush on IVP

**Q: What are the clinical features of MSK?**

A;

- Asymptomatic
- Renal colic (50%) (m/c)
- UTI (25%)
- Hematuria (12%)
- Stones (6%)

**Q: what is the m/c biochemical abnormal in MSK?**

A: Hypercalcaemia

**Q: what type of stones is a/w MSK?**

A: calcium oxalate and Calcium phosphate

**Q: what is the Mx of MSK?**

A: MSK itself is untreatable

Complications of MSK need to be managed

- Hypercalcaemia → thiazides
- Infn → antibiotics (long term)
- Calculus formation → ESWL/PCNL

**Q: what is the difference b/w parapelvic cyst v/s peri-pelvic cyst?**

A:

<b>Parapelvic cyst</b>	<b>Peri pelvic cyst</b>
<ol style="list-style-type: none"><li>1. Simple renal cyst</li><li>2. Originates from renal parenchyma</li><li>3. Impinges upon renal pelvis</li><li>4. Unilateral</li></ol>	<ol style="list-style-type: none"><li>1. not easily a renal cyst</li><li>2. originated in renal sinus</li><li>3. have a lymphatic origin</li><li>4. basically a endo lymphatic cyst from renal sinus which impinges upon renal pelvis</li><li>5. Bilateral</li></ol>

---

***VHL disease***

Chromosome	-chromosome 3
Gene	-VHL gene
Etiology	- VHL is a tumour suppressor gene mutations cause ↑↑ HIF activity
Inheritance	- autosomal dominant by Knudson's two hit theory
Age of presentation	- 30-40 yrs

**Clinical features:**

- Renal cyst (75%) (mc)
- RCC clear cell
- Pheochromocytoma
- Retinoblastoma
- Hemangioblastoma
- Endolymphatic ear cyst
- Cyst of pancreas/ Epididymis

Types 1: → without Pheo

2 →. with Pheo

2A: → absent RCC

2B: → Both RCC & Pheo present

2C: → only Pheo

**Characteristics of cyst**

- Multiple
- B/L
- Simple

**Characteristics of RCC**

- Multiple
- B/L
- Clear all

**Evaluation:** USG, CECT

**Management:** partial Nephrectomy

**Q: what is the current concept of screening for VHL?**

A: previously all patient's relative (at risk) were used to be screened

With the availability of genetic DNA analysis only the affected individual need to be screened using Cambridge protocol.

**Q: what is the name of screening protocol?**

A: Cambridge protocol by "Meher et al"

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the components of Cambridge protocol?**

A:

Physical exam + ear exam → yearly

Urine exam for metanephrines & normetanephrine → yearly

Fundoscopy → yearly

USG abdomen → yearly

MRI Brain → every 3 yrs for age 10-50 yrs

CECT abdomen → Every three years for age 10-50 yrs

– Every five yearly for age >50 yr





***Neeraj Sharma's-  
NOTES FOR UROLOGY PRACTICALS***

**D.S.D**

## **Basics of sexual differentiation**

**Q: What are steps of normal sexual differentiation?**

A: 3 steps

1. Establishment of Chromosomal sex
2. Gonadal Differentiation
3. Phenotypical sexual differentiation

**Q: How is chromosomal sex established?**

A:

- SRY –Gene (chromosome Y<sub>p</sub>) (short arm of chr Y)
- The major factor gene is SRY.
- It is the transcription of SRY to mRNA and its subsequent translation to protein signals that leads to sertoli cells formation.
- Other genes are WT<sub>1</sub>, ST-1, SOX-9, WNT-4
- Activation of SRY gene leads to development of sertoli cells → production of MIS (8<sup>th</sup> week) → disappearance of Mullerian duct (9<sup>th</sup> week)
- SRY + (SF-1 (steroidogenic factor-1) Leads to Production of steroids (testosterone))

**Q: Which gene is responsible for female sex development?**

A: Initial Theory (Glenister), → female sex develops by default that is, in the absence of MIS and testosterone, the fetus will acquire a female sex.

Now Proven WNT -4 is required for ovarian development (kin et al)

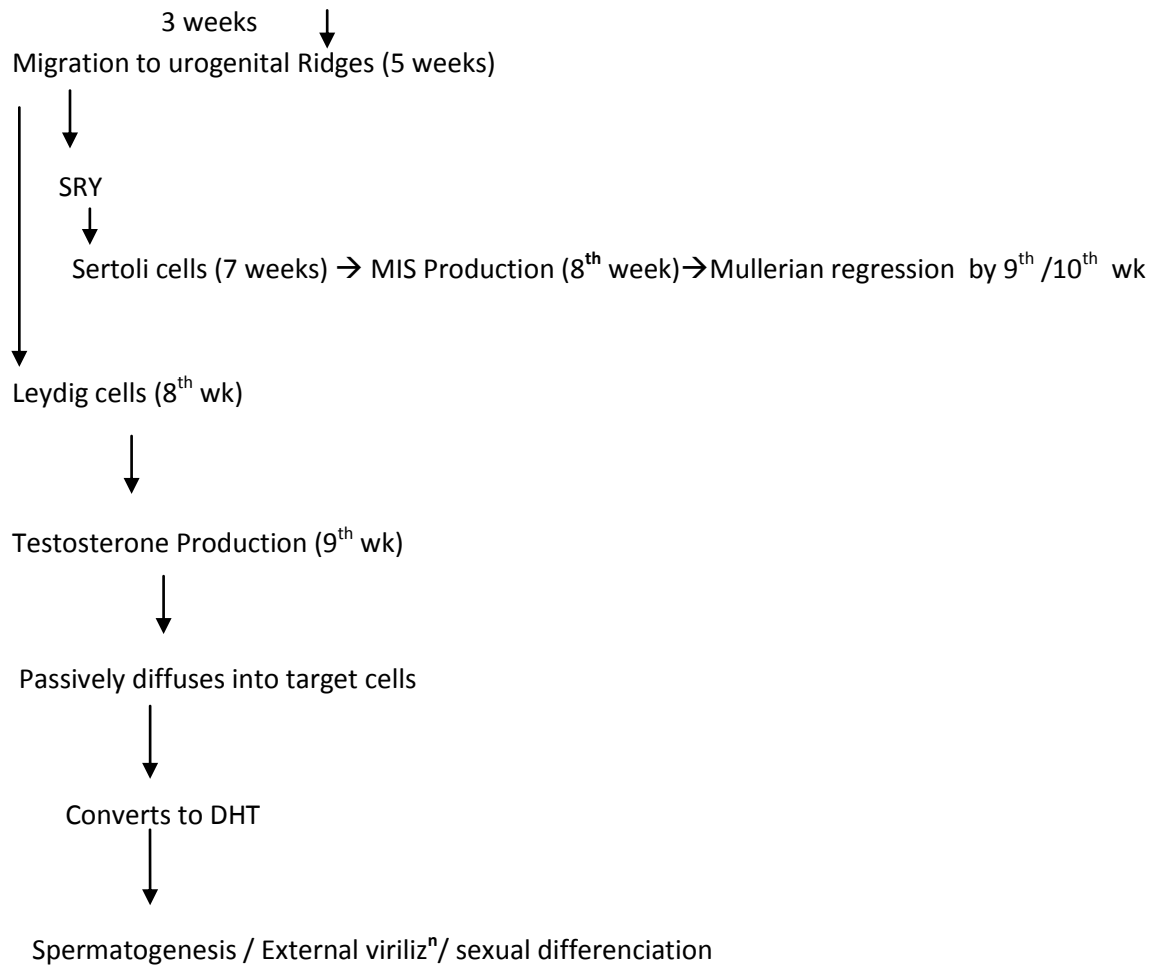
**Q: what is the other theory by Glenister?**

A: In Hypospadias: Glenister also proposed that glans urethra development as invagination of the distal urethral meatus and fuses with main penile urethra at corona.

## **Neeraj Sharma's ...Notes For Urology Practicals**

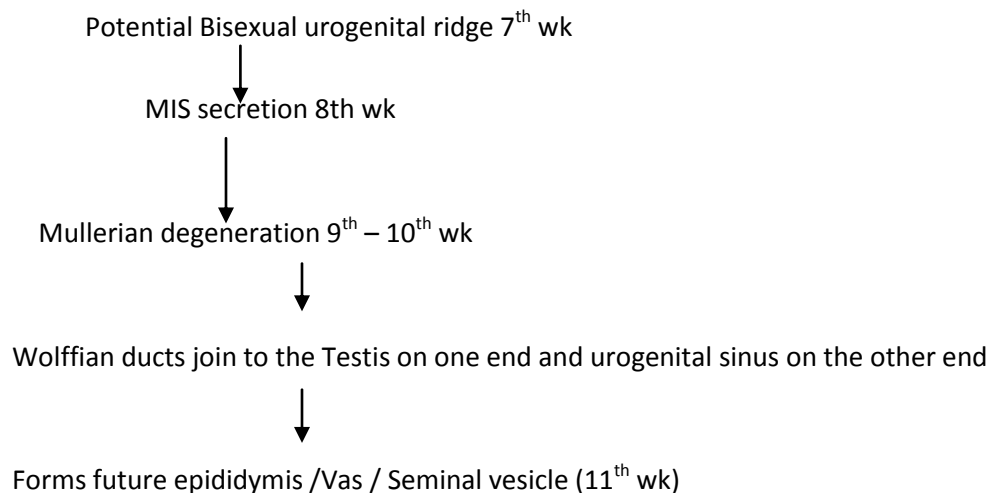
### **Q: How does Gonadal Differentiation occurs?**

A: Primordial germ cells on posterior wall of sac



### **Q: How does phenotypical sexual differentiation occurs?**

A:



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What structures of Genital tract are not formed by Wolffian/mullerian ducts?**

**A:**

<b>Duct</b>	<b>Forms</b>	<b>Not formed</b>
Wolffian	Epididymis	Testis
Mullerian	Fallopian tubes, uterus, upper 1/3 vagina	Ovaries

**Q: What is the Mullerian remnant in male?**

A: Prostatic utricle

**Q: How does a female anatomy formed?**

A: Mullerian ducts persists (in the absences of MIS)



Upper ends become fallopian tubes → Lower ends fuse to form the uterus → development of utero-vaginal plate → Vagina formation

**Q: when is the male genital formation complete?**

A: By 12 weeks – 13 weeks

**Q: When does penile growth & Testicular descent occurs?**

A: in 3<sup>rd</sup> Trimester. (So patients of Hypospadias usually have undescended Testis also)

**Q: what is the psycho sexual differentiation?**

A: the ability to identify self as a male/female

**Q: what is Blue room / Pink room theory?**

A: **Blue room / Pink room theory** states that “as per psycho social differentiation the children are neutral at birth and as per their rearing as boy or girl, the children identify themselves in their gender.

**Q: what is the current concept?**

A: Psycho sex differentiation occurs prenatally(before birth) in a child (money & diamond et al).

This prenatal sex differentiation involves brain imprinting and thus cannot be changed by pattern of rearing /bringing up of child.

**Q: Where is WT<sub>1</sub> located? & what is its importance?**

A: WT<sub>1</sub> located on chr 11p

Associated with

- 1) Wilms Tumour
- 2) Danys Drash—Wilms tumour, Congenital nephropathy and DSD male pseudo hermaphrodite
- 3) Frasier Syndrome –Gonadoblastoma tumour, Congenital Nephropathy (FSGS), Wilms tumor

## Neeraj Sharma's ...Notes For Urology Practicals

	<u>Klinefelter's</u>	<u>46XX</u>	<u>Turner syndrome</u>	<u>Mixed gonadal Dysgenesis</u>	<u>Ovo testis or True hermaphrodite</u>
<u>Genotype</u>	Atleast 2X one Y xxy, xxxy	46xx	45xo	45 xo/46XY	46xx 60%/ 46xx-xy-33%/ 46xy- 7%
<u>Phenotype</u>	Male b'coz of Y	Male (ideally –it should be female	Female	Usually of Prader 0-6	Usually female prader 0-6
<u>cause</u>	Non dysfunction of 'X' in meiosis	SRY trans-location	Absence of Y	Dysgenesis of one gonad	One gonad has features of both ovary & testis. So one ovary +one ovotestis 80%, one testis +one Ovotestis 20%
<u>Histo-logical</u>	Degenerated semeniferous tubules, Azoospermia	Degenerated semeniferous tubules, Azoospermia	Streak ovary fibrous ovary gland	No germ cells infertile	Ovarian Tissue is normal Testicular tissue is dysgenetic
<u>Endocrinal</u>	↓Testosterone, ↑FSH, ↑LH	↓Testosterone, ↑FSH, ↑LH	↓Oestrogen, ↑FSH, ↑LH	Unilateral testis+→MIS+→ no mullerian organ this side,  2nd testis absent-→ MIS(-) → fallopian tube + Hemi uterus +	In ovo-testis Ovarian end is soft and Testicular end is hard
<u>Morpho-logical</u>	Long legs , Tall height (tall for age), small testis , female pattern of fat Gynecomastia Azoospermia	Long legs , Tall height (tall for age), small testis , female pattern of fat Gynecomastia Azoospermia	Short height Webbed neck, Wide spaced nipples, Amenorrhea, No secondary sex characters, Cubitus valgus	-Since Testosterone + → Phallus +  -But testosterone level low → small Phallus	Uterus+ → see GUS-Karyotype (Grambuch protocol) Ovotestis/MGD/PG D→ Uterus + One ovary + with fallopian tube +  On Ovotestis side → gonad may be anywhere in the path of descent of testis. Fallopian tube, vas deference +/-

## Neeraj Sharma's ...Notes For Urology Practicals

	<u>Kline filters</u>	<u>46XX</u>	<u>Tuner syndrome</u>	<u>Mixed gonadal Dysgenesis</u>	<u>Ovo testis or True hermaphrodite</u>
<u>Complications</u>	Leydig cell Ca Sertoli cell Ca Ca Breast	Leydig cell Ca Sertoli cell Ca Ca Breast	Renal anomalies – renal Agenesis, -Horse shoe kidney, Vascular anomalies, Gonadoblastoma	Males are feminine  Females are masculine  Gonadoblastoma	Gonadoblastoma
<u>Mx</u>	Androgen supplements  ART  Ca testis surveillance	Androgen supplements  ART  Ca testis surveillance	-search for Hidden Y  -Oestrogen supplementation - Growth hormone replacement	Gender assignment ,  Appropriate Gonadectomy  Hormonal supplementation	Excise Testicular / Ovotestis  Assign female gender,  Hormonal Supplementations

**Q: what is the difference between mixed, partial and pure gonadal dysgenesis?**

**A:**

- Mixed gonadal dysgenesis-one of the two gonads is dysgenetic
- Partial gonadal dysgenesis- Both the gonads are dysgenetic upto variable proportions
- Pure gonadal dysgenesis- When both the gonads are purely / completely dysgenetic

**Q: What is partial gonadal dysgenesis?**

**A:**

- Also known as bilateral gonadal Dysgenesis
- sister concern of unilateral (mixed) G.D
- Both the gonads are dysgenetic upto variable proportions
- Genotype 46XX/ 46XX or XY,/46XY
- Phenotype Prader's 0-6
- Mx : Gonadectomy , gender reassignment, Growth Hormone supplement

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What is pure Gonadal Dysgenesis /SWYER's syndrome?**

A:

- When both the gonads are purely / completely dysgenetic
- No MIS → so uterus +, fallopian tube +, Vagina +
- Functionless, streak ovaries, Karyotype is usually 46 XY
- Phenotype – female
- Does not have Turner syndrome like physical appearance
- Mx B/L Gonadectomy
- Cyclic oestrogen / progesterone supplementation

### **Q: What are anomalies associated with Turner's syndrome?**

A:

1. Renal anomalies → Horse shoe, → Agenesis
2. Vascular anomalies
3. Gonadoblastoma

### **Q: Why is 'Pure' Gonadal dysgenesis "PGD" called "Pure"?**

A: PGD is very closely related to Turner's syndrome

- The gonadal histology is same as of Turner's
- The Risk of Gonadoblastoma is also same
- But P.G.D lack the somatic defects associated with turners syndrome like broad chest, webbed neck, short structure, cardiac & renal abnormalities
- Due to lack of somatic abnormalities PGD is called "Pure" or isolated Gonadal dysgenesis

### **Q: what is true Hermaphrodite?**

A: Ovo-Testis is known as True hermaphrodite rest everything becomes pseudo-hermaphrodite

### **Q: How does an ovo-testis look like?**

A: Yellowish ovary part

Whitish Testis Tissue

### **Q: What will you do next?**

A: Laparoscopic Biopsy; using Lap-Scissors

If excessive bleeding take suture / cautery

### **Q: How will you make out that given gonad is ovary or testis?**

A: Ovary → yellowish, associated with fimbria / fallopian Tubes

Testis → White, associated with Vas deferens



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: how will you take Biopsy for Testis (scrotal Testis)?**

A: Complete length wedge open Biopsy from upper pole to lower pole (like a complete water-melon slice).

### **Q: Why do you need to take gonadal Biopsy?**

A: Rule out ITGCN, Gonadoblastoma and other malignancy if any,  
See for Ovarian stroma+ Ovarian Follicles  
See for Testicular semeniferous tubules, Leydig cells

### **Q: What is the most significant worry in pts with Klinefelter & Turners?**

A: Klinefelter pts have 8 times R.R of Breast cancer  
Turner pts have more risk (30%) for Gonadoblastoma.

### **Q: What is the Hallmark Feature of Denys Drash syndrome?**

A: congenital Neuropathy with early onset proteinurea

Other features

- Calyceal blunting
- Progressive renal failure/Mesenchymal / Glomerular sclerosis
- Wilm's tumour
- Gonadoblastoma / male pseudo-hermaphroditism

### **Q: What are the different forms / permutations of ovotestis?**

A: One ovary + one Ovotestis (m/c)

One testis + one ovotestis

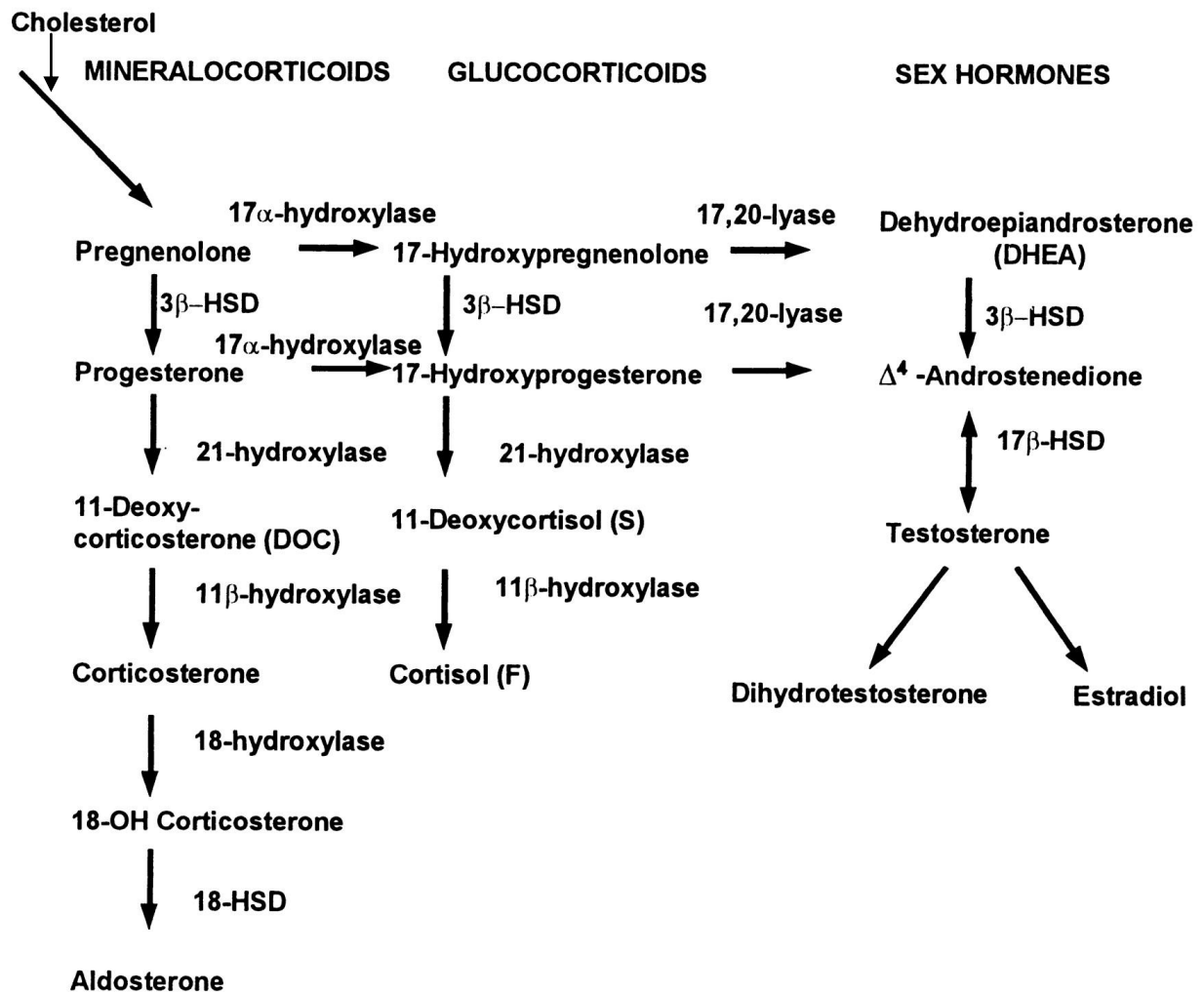
One ovary + one testis

B/L ovotestis



## Disorders of Steroidogenesis

Q: Describe Steroidogenesis?



**CAH**

**Heritance:** autosomal recessive

**Intro:** Deficiency of 21-OH      → } ↓ formation of cortisol & corticosterone →  
Deficiency of 11-OH      }    ↑ ACTH (pituitary) → Rise in Testosterone

**Phenotype:** males are super males (Hercules)

Males → over virilization, early Bone growth  
Short Height, Deep voice, long penis

Females are masculine (due to ↑ Testosterone), Prader 0-6

Female → clitoromegaly, scrotal fusion, virilization,

**Genotype**

Males -46 XY normal, females 46 XX normal

**Clinical types**

- I. Virilization +salt wasting (due to ↓ aldosterone)most common -75%
- II. Virilization alone (25%)
- III. Non virilization / no salt wasting (rare)

**Associated abnormalities** → Hydronephrosis, renal Duplication anomalies

**Genes responsible** → CYP-21-A → 21-OH defects

CYP-11-B → 11-OH defects

**Biochemical abnormal** →

- aldosterone deficiency → Hypovolemia, Dehydration Hyperkalemia, Hyponatremia,
- Glucocorticoid deficiency → Hypoglycemia, reduced immunity

**Diagnosis:**

Antenatal

1. Amniotic fluid assessment → ↑17-OH progesterone @ 12 weeks of gestation
2. Chronic Villi cells → DNA analysis @ 9-11 weeks

## **Neeraj Sharma's ...Notes For Urology Practicals**

Post natal: (In females/child with ambiguous genitalia)

USG → Uterus +, Fallopian tube +, Ovary +

Sr. Ex → ↑17-OH progesterone

24 Hr Urine steroid profile → ↑17-OH Progesterone } after 4 days of birth

Karyotyping –PCR → DNA analysis CYP-21, CYP-11

For 11-OH deficiency –raised serum urine levels of 11-OH des-oxy cortisol

### **Management**

1. (Hydrocortisone(Glucocorticoid) +/-Fludrocortisone (mineralocorticoid)) supplements
2. Feminizing / correction genitoplasty (if 46XX) at the age of 6 months
3. HTN control
4. B/L adrenalectomy for uncontrolled cases
5. Antenatal management : inj<sup>n</sup> dexamethasone to mother starting from 6<sup>th</sup> wk of gestation

**Q: What is the most frequently found DSD?**

A: CAH Congenital Adrenal Hyperplasia

**Q: what are the clinical presentations of CAH?**

A: Classic (75%) = salt wasting + virilization

Non classic (25%) = only virilization

**Q: what is the cause of CAH?**

A: Conversion of Active CYP-21-A into Inactive CYP-21-A due to Mutations.

**Q: What is the irony / problem in treating CAH antenatally?**

A:

- Testosterone and its effects from 8<sup>th</sup>-10<sup>th</sup> wk of antenatal life
- Major virilization (scrotal fusion & phallus formation) process occurs by 10-11<sup>th</sup> wk
- So, Mx of CAH is done before 9<sup>th</sup> wk of fetal life (9<sup>th</sup> wk from LMP)
- But diagnosis can be confirmed only at chronic Villi sampling @ 11-12 wk
- So all pts (fetuses) are Rx at presumptive manner
- 7 out of 8 are unnecessary treated.

**Q: What is the M/C cause of ambiguous genitalia in new Born?**

A; CAH

**Q: What is doll's perineum?**

A: In severe CAH, fusion of labial scrotal folds

Leading to flat perineum, like that of doll's perineum

With inconspicuous urethral opening

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: when can 17-OH & Sr. electrolyte are checked?**

A;

- serum electrolytes should be sent immediately
- 17-OH After 4 days of Birth, 17-OH results come after 48 hrs of sample
- PCR-Fish Results take 24-36 hrs to come

**Q: what is the first tier of I<sub>x</sub> in CAH?**

A: Gonadal Ex.	}	+	Plasma Glucose	}	+ Urinary steroid profile
USG					
17-OH Steroid					
Karyotype					
			Sr. electrolytes		
			Testosterone		

**Q: How can you confirm the diagnosis of CAH?**

A: Urinary steroid profile –spot or Urinary steroid profile – 24 hour

**Q: What are the 2<sup>nd</sup> Tier Tests?**

A: Anti mullerian Hormone  
HCG stimulation Test  
Laparoscopy

**Q: What hormonal Ix are necessary in adults?**

A: FSH, LH,  
Oestrogen, Testosterone  
Sex hormone Binding globulin (SHBG)  
Prolactin, DHEAS  
TSH

**Q: What are the indications for MRI?**

A: When USG could not delineate the pelvic anatomy

**Q: what are the indications for genitoscopy / genitogram?**

A: Genitogram → in cloacal deformity  
Genitoscopy → Just before the definitive Surgery (on same sitting)

**Q: When will you do female genitoplasty?**

A: any time after 6 months  
Opinion 1 → @ Childhood  
Opinion 2 → @ adulthood

**Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you manage CAH?**

A;

- Medically stabilize
- Correct Hyperkalemia, Hyponatremia, sr. electrolytes
- Supplement Glucocorticoid / mineralocorticoid
- Corrective Genitoplasty
- Correct androgen levels

**Q: How will you proceed for genitoplasty Sx?**

A: Medically fit



Anesthesia fit      -Pre op dexamethasone supplement, - Post op dexamethasone  
|                                  supplementation



Corrected androgen levels (otherwise Re-Clitoromegaly), so androgen levels should be in control before doing Sx.

### Q: What are the Indications for Genitoscopy?

A: Just before Genitoplasty (in the same sitting)

To assess upto what level is common channel

## Neeraj Sharma's ...Notes For Urology Practicals

**Q: what is androgen insensitivity syndrome?**

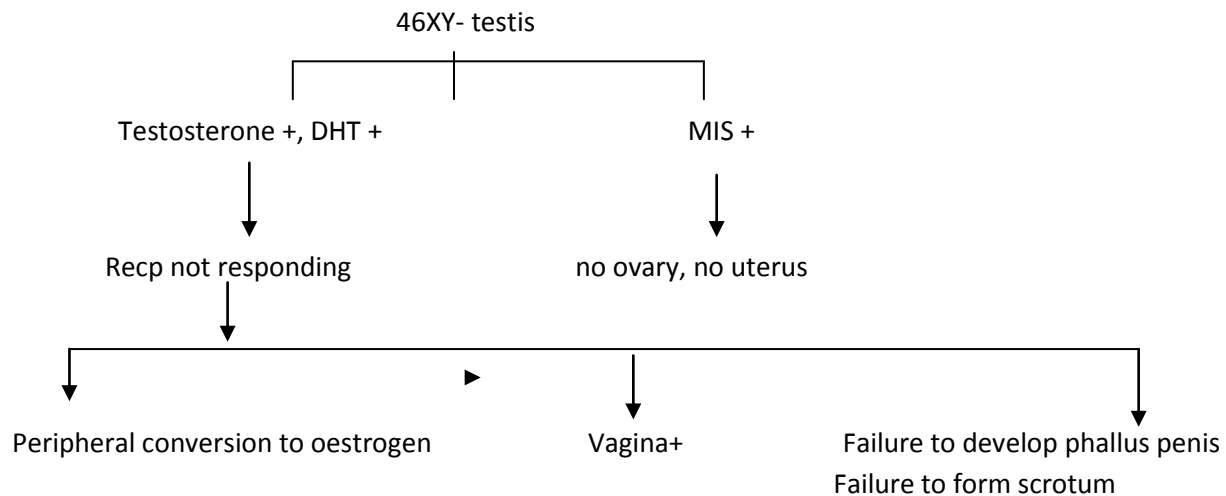
A: Androgen Receptors are not responding to the testosterone / DHT.

Inheritance: Autosomal Recessive

Genotype → 46XY

Phenotype → female / undermuscularized male

Pathophysiology



Gene Responsible – A.R- Gene on X<sub>q</sub>

Types:- 1).Complete AIS, 2) Partial AIS, 3) Mild AIS

Physical characteristics:

Genotype male and Phenotype Female - with vagina +, no penis, no uterus, no fallopian tubes

Breasts +, primary amenorrhea, B/L undescended Testis

In short the patient is a complete female phenotypically but without uterus and having testis as gonads

Diagnosis:

1. Prenatal USG s/o male → Born as female
2. Testes found during inguinal Hernia Surgery
3. USG – normal
4. Karyotype 46 XY
5. PCR gene Test for AR gene on X<sub>q</sub>

Management

1. Gender assign as female
2. Leave gonads till puberty (help in Breast development)
3. Post pubertal Gonadectomy
4. Cyclic OCP supplementation

Complications: Gonadoblastoma



## Neeraj Sharma's ...Notes For Urology Practicals

**Q: what is partial androgen resistance or REIFENSTEIN syndrome?**

A: Androgen receptors respond but not completely

Either numbers of receptors are less or their function is less

Phenotype → Prader's 0-6

Genotype → 46 XY

Pathophysiology:

Same as AIS except

Some amount of Receptors are working 50%

Phallus – Variable length

Scrotum – variable fusion

Hair distribution → variable

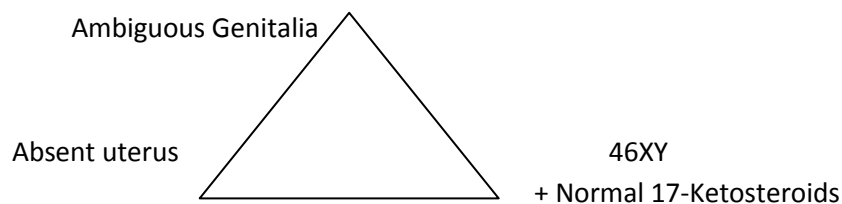
Clinically:

Male with perineoscrotal Hypospadias

Cryptorchidism+

Gynecomastia +

Diagnosis:



Investigations

- USG
- Endocrine Test: raised T, raised DHT, FSH, LH normal or ↑↑
- HCG stimulation Test → rise in Testosterone
- PCR → Androgen Recp gene study

**M<sub>x</sub>:** according to gender assignment

Male	female
<ul style="list-style-type: none"><li>- Rx for Cryptorchidism</li><li>- Rx for Hypospadias</li><li>- Androgen supplement at puberty</li><li>- Growth Hormone supplementation</li></ul>	<ul style="list-style-type: none"><li>- Gonadectomy</li><li>- Genitoplasty</li><li>- Estrogen / Progesterone replacement @ puberty</li></ul>

Complications: Brain Imprinting

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How does fetal Testosterone act locally or systematically?**

A: Locally:

- Fetal Testosterone is produced by testis Leydig cells & not by adrenals
- Testosterone is converted to DHT in fetal cells
- Dihydrotestosterone is the chief (main) active androgen

**Q: what is the hormonal (endocrine) status in Testicular regression syndrome or B/L vanishing Testis Syndrome?**

A; Castrated Testosterone levels

Elevated Gonadotropin levels (FSH & LH)

**Q: What is Reifenstein syndrome?**

A: Decrease in number of androgen receptors or decrease on fn of androgen receptors is called Reifenstein syndrome

**Q: What iso-enzyme deficiency is there in 5 alpha reductase deficiency?**

A; 5-alpha reductase Type –II

**Q: What is Persistent mullerian duct syndrome?**

A: due to faulty MIS prod<sup>n</sup> or faulty MIS receptors mullerian duct and its derivatives persist. Persistent mullerian duct syndrome is also associated with transverse Testicular ectopia

## **Investigations in a DSD child**

**Q: What special will you ask in History in a child of DSD?**

A; History → H/O infant death

Neonatal deformity

H/O amenorrhea, infertility, hirsutism

H/O maternal use of medications / Steroids /OCP

**Q: What will you see in local examination?**

A: Phallus-size, Hypospadias

Urogenital sinus opening

- Type of opening
- Number of openings
- Type of labioscrotal folds
- Rugosity on labioscrotal folds

Palpable gonad

Scrotum fused / unfused

**Q: What is the sequence of investigation in a pt with ambiguous genitalia?**

A; GUS-KARY

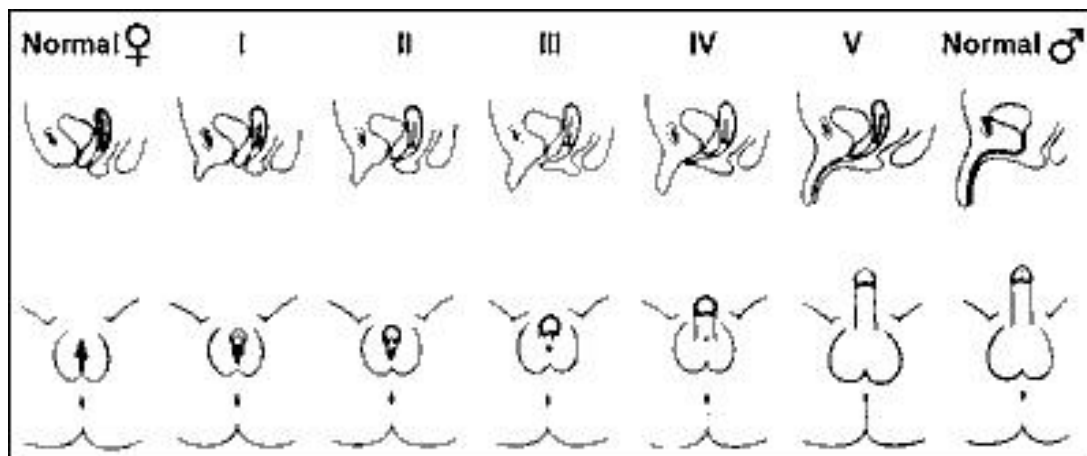
- Gonadal Examination
- USG for uterus
- Steroid – 17-OH progesterone
- KARY- KARYOTYPE

**Q: What is Prader classification?**

Prader classification is the numerological expression to describe the degree of masculinization in a child

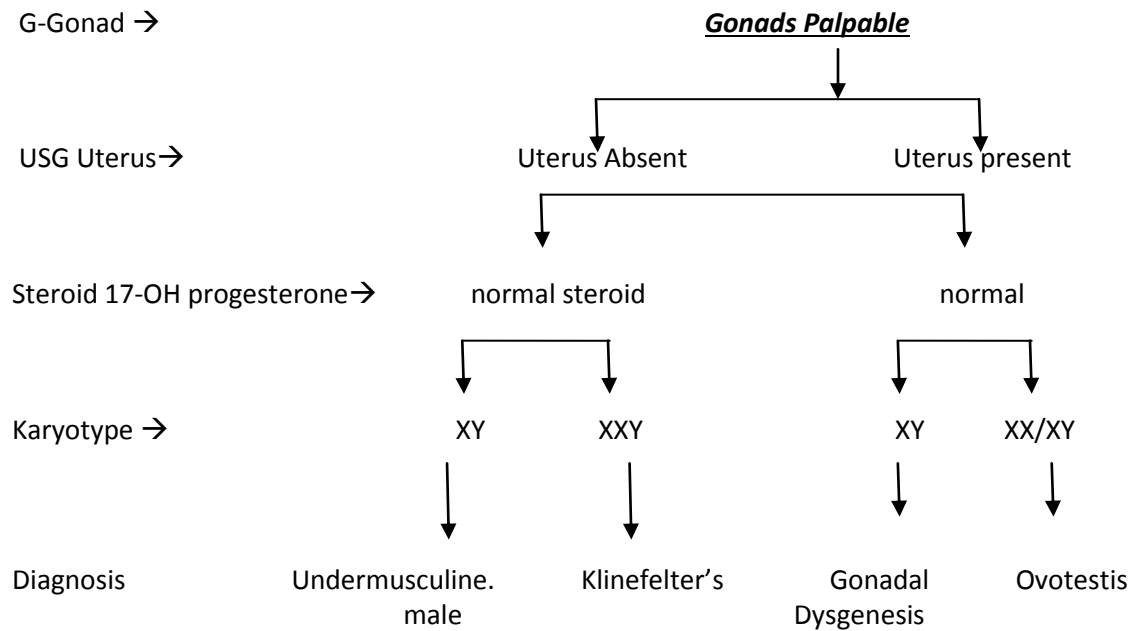
Prader '0' → normal female

Prader '6' → normal male

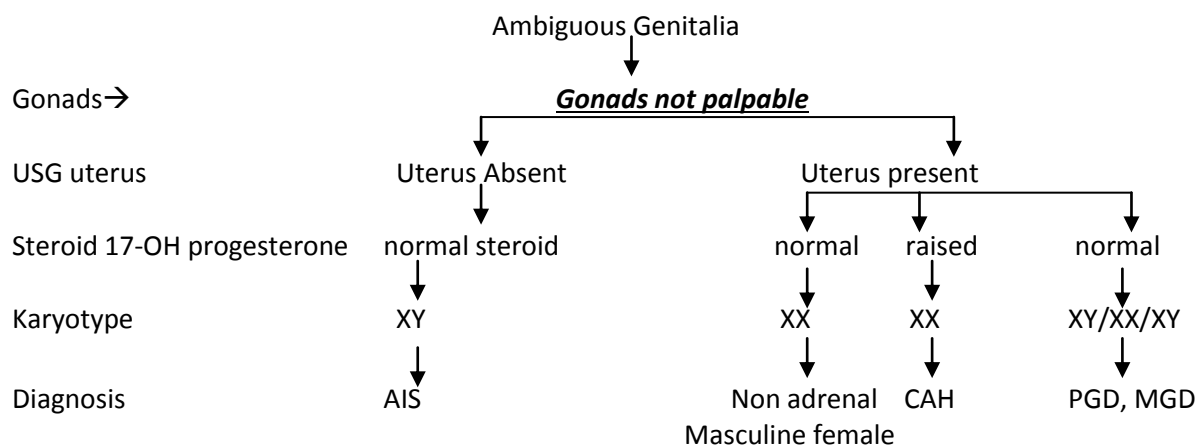


## Neeraj Sharma's ...Notes For Urology Practicals

**Q: Elaborate GUS –KARY form Ambiguous Genitals?**

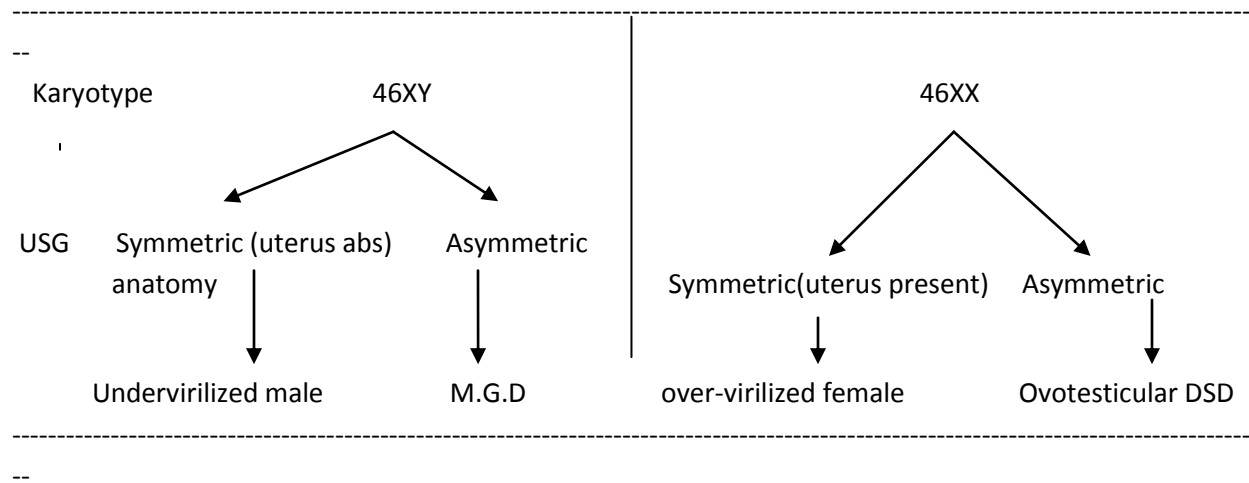


Endocrine Evaluation



**Q what is Donahoe Protocol of Evaluation?**

A; in Donahoe protocol Karyotype is done first and then USG



**Q: What is Tanner classification?**

A: Components → Pubic hair, penile length, scrotum appearance

Tanner stage 1 → child like

Stage 5 → adult like

**Q: What endocrine investigations will you do in a child of DSD?**

A:

- serum electrolyte
- Serum Testosterone , DHT, 17-OH progesterone
- LH, FSH
- HCG stimulation test
- PCR-characterization of CAH / Recp. Gene Mutations

**Q: What other I<sub>x</sub> are feasible in a child of DSD?**

A: Laparoscopy to see for undescended testis or rudimentary uterus

Vaginoscopy

HSG

**Q: What is extended Grumbuch's protocol?**

A: GUS kary for all (compulsory) + laparoscopy for all to confirm the USG findings and to rule out ovotestis

**Q: Which sample will you send for karyotyping?**

A: blood (use leucocytes)

**Q: what are the various methods of doing karyotyping?**

A:

- GTG banding using Giemsa stain (most commonly used)
- Flow / laser karyotyping based on weights of chromosome
- FISH fluorescence hybridization

**Q: What is the relation b/w DSD and Unilateral cryptorchid testis?**

A: for unilateral undescended Testis the Risk of DSD is 30%

Any distinctly palpable gonad along the pathway of descent is highly suggestive of Testis and rarely of ovo-Testis

**Q: in post natal period when will you do serum 17-Hydroxy progesterone in a child of DSD?**

A: after 4 days of birth

**Q: what is the present consensus statement for impalpable testis & hypospadias?**

A: National health consensus guidelines

Patient with unilateral impalpable testis and Hypospadias should be regarded as DSD; until otherwise proved. They should have Karyotyping done.

**Q: what is the importance of palpable gonad in a child of DSD?**

A: a palpable gonad is always Testis, as ovaries do not descend.

(The above statement also indirectly implies that in case of a palpable gonad, there should be some type of "Y-chromosome present either hidden, translocated or overt.)

It virtually rules out 46XX-DSD

**Q: What is "penis at 12" syndrome?**

A: In a DSD female child; at puberty there is increase in FSH, LH leads to increase length of clitoris → penis at 12-syndrome.

**Q: According to guidelines; what I<sub>x</sub> are mandatory (1<sup>st</sup> line) at the time of Birth/diagnosis in a child of DSD?**

A:

1. Karyotype
2. USG
3. 17-HO progesterone
4. Plasma electrolytes
5. If CAH is diagnosed no further I<sub>x</sub> is required

**Q: what all are the second line of investigations in a child of DSD?**

A;

Genitography:

- For information on urogenital sinus
- To the confluence of uterus & vagina
- Duplication of vagina
- Relation of urethra to vagina

EUA --. Ex<sup>m</sup> under anaesthesia

Cystoscopy:

- To see for confluence of urethra & Bladder
- To see for Prostatic utricle

Laparoscopy:

- To locate gonads
- Presence of mullerian structures
- To take gonadal biopsy if needed

**Q: What is Swyer's syndrome?**

A: Pure (B/L) gonadal dysgenesis is also called Swyer's syndrome

Swyer's syndrome

46XY – Karyotype

If Karyotype is 46XY → then only it is Swyer's syndrome

**Q: what is EMS?**

A: External masculinization score

- It is a combination of 1. Phallus size, , 2. Labioscrotal fusion 3. Site of gonads & 4. Location of external meatus

**Q: what constitutes a significant past H/O in DSD?**

A: family H/O – Consanguinity

- Still birth
- Multiple miscarriages
- Fertility problem

Personal H/o : delayed puberty

Past H/o: Hernia

Maternal H/o: drug exposure during pregnancy

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the M/C cause of ambiguous genitalia in new Born?**

A; CAH

**Q: when can 17-OH & Sr. electrolyte are checked?**

A;

- serum electrolytes should be sent immediately
- 17-OH After 4 days of Birth, 17-OH results come after 48 hrs of sample
- PCR-Fish Results take 24-36 hrs to come

**Q: what is the first tier of I<sub>x</sub> in CAH?**

A: Gonadal Ex.	}	+	Plasma Glucose	}	+ Urinary steroid profile
USG					
17-OH Steroid					
Karyotype					
			Sr. electrolytes		
			Testosterone		

**Q: How can you confirm the diagnosis of CAH?**

A: Urinary steroid profile –spot or Urinary steroid profile – 24 hour

**Q: What are the 2<sup>nd</sup> Tier Tests?**

A: Anti mullerian Hormone  
HCG stimulation Test  
Laparoscopy

**Q: What hormonal Ix are necessary in adults?**

A: FSH, LH,  
Oestrogen, Testosterone  
Sex hormone Binding globulin (SHBG)  
Prolactin, DHEAS  
TSH

**Q: What are the indications for MRI?**

A: When USG could not delineate the pelvic anatomy

**Q: what are the indications for genitoscopy / genitogram?**

A: Genitogram → in cloacal deformity  
Genitoscopy → Just before the definitive Surgery (on same sitting)

**Q: when can urine steroid profile be done?**

A: after 3 months of life



## **Neeraj Sharma's ...Notes For Urology Practicals**

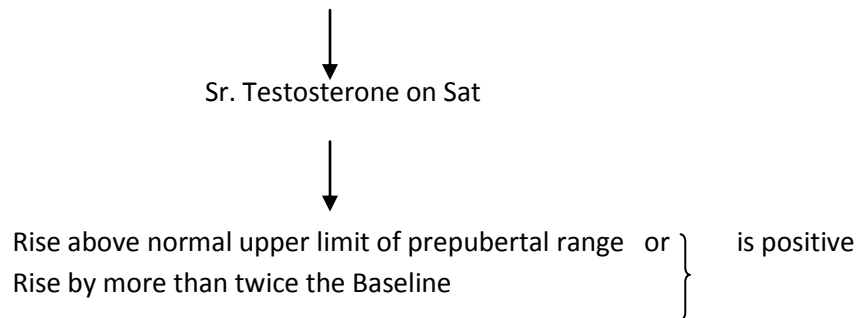
**Q: what is the status of HCG stimulation test in a child of DSD?**

A: HCG stimulation test is still validated to help in differentiating different forms of 46XY –DSD

**Q: What is HCG stimulations test?**

A: Stimulations with HCG to detect f<sup>n</sup> of Testicular Tissue as well as biosynthesis defects in testosterone production

1000-1500 unit HCG- i.m. on 3 alternate days -Mon, wed, Friday (or consecutive days as per institute protocols)

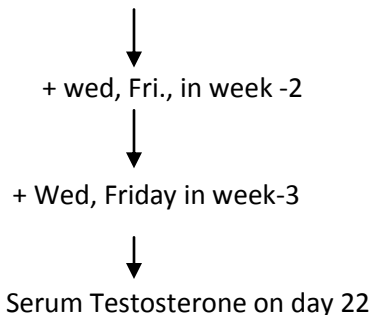


(N.B. Testosterone should be seen after the 5<sup>th</sup> day of 1<sup>st</sup> dose of HCG)

**Q: what will you do for inconclusive HCG stimulation test?**

A: Prolonged / Extended HCG Test

Std. HCG stimulation Test (Mon, Wed, Fri) wk 1



**Q: when will you do ACTH stimulation test?**

A; also called Synacther stimulation test.

When Testosterone levels are still low even on prolonged HCG stimulations test

**Q: What is MRKH?**

A: Mayer – Rockitansky – Kuster- Hauser syndrome

It is isolated Vaginal Agenesis syndrome

- Uterus, fallopian tubes, Ovaries are normal
- vaginal lower 2/3 agenesis

**Q; what are the types of MRKH?**

A: MRKH –I (65%) classical -> only isolated vaginal aplasia

MRKH –II (36%) → vaginal aplasia associated with other deformities like

- Vertebral
- Cardiac
- Urological –Unilateral renal agencies (URA), -Renal ectopia
- Otological deformity

**Q: what is the M/C patient presentation?**

A: Primary amenorrhea with abd pain (cyclic).

**Q: what are the renal abnormal associated with MRKH?**

A: Unilateral renal agencies

Renal ectopia

**Q: What is the endocrinal status of pt?**

A: all absolutely normal

**Q; what are the D/Ds for MRKH?**

A:

- 5-alpha – reductase deficiency
- AIS
- Congenital adrenal Hyperplasia
- Hermaphroditism / DSD
- MIS deficiency
- Turner syndrome

**Q: what is the management goal of MRKH treatment?**

A: to make a neo-vagina which is cosmetically as well as functionally acceptable

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the surgical options to make neovagina in MRKH?**

A:

1. Frank Technique
  - Progressive perineal dilation using moulds
2. McIndoe Technique
  - SSG graft fixed over silastic mould; after bluntly creating a space between urethra & rectum
  - most common performed Sx
3. Williams Vaginoplasty
  - Uses vulval flaps to make a vaginal tube
4. Rotational flap procedures
  - Uses gracilis myocutaneous flap to create neo vagina
  - Pudendal thigh flap can also be used
5. Modified BALDWIN (Intestinal neovagina)
6. Velchietti Technique
  - Transperitoneal upward traction on an acrylic olive placed in vagina

**Q: How will you reconstruct a vagina in a child of DSD?**

A:

- Modified BALDWIN -- Bowel neo vagina (using ileum), Good result, Functional coitus
- McIndoe- skin neo vagina, more chances of vaginal stenosis

**Q: How do you make a neo-Vagina in your set up?**

A: In our hospital, we use sigmoid colon

Sigmoid colon: rotate it upside-down and stitch up to perineum, the upper end can be closed blind or stitched up to cervix.

**Q: What are the complications of MRKH Sx?**

A: Donor site scarring

Post op Pain due to lack of lubrication, stenosis and scarring

Rectovaginal / Urethrovaginal fistula

Require post op regular dilation

**Q: When will you do genitogram?**

A: In cloacal abnormality

**Q: Do you do genitoscopy + genitoplasty in same sitting?**

A: Yes same sitting

And then plan final Surgery

## ***Genital Reconst<sup>n</sup>***

---

**Q: what are the various feminizing surgeries Sx?**

A; clitorereduction

Separation of vagina & urethra

Vaginoplasty (at teen age)

Aesthetic refinement

**Q: What are the various Masculinizing surgeries Sx?**

A: Hypospadias Sx

Excision of Mullerian structures

Orchidopexy

Phalloplasty

Aesthetic refinement

**Q: what is piggy-back penis?**

A: In a small / micropenis; the flap is constructed & laid over the original penis

- Flap helps in increased length of penis
- Original penile corpora are used as erectile bodies

**Q: what is the most common operation performed for DSD?**

A: Gonadectomy:

- Germ cell malignant only occurs in pts of DSD who have 'Y' chromosome
- High risk of malignancy in pt with gonadal dysgenesis with intra abd Testis

**Q: what are the three components of female genital reconst<sup>n</sup>?**

A:

- |                  |   |                      |
|------------------|---|----------------------|
| 1. Clitoroplasty | } | done in same sitting |
| 2. Labioplasty   |   |                      |
| 3. Vaginoplasty  |   |                      |

### **Clitoroplasty...**

**Q: What is Schmid's principle technique for Clitoroplasty?**

A: Preservation of Neurovascular Bundle & glans

Excising the corpora cavernosa through subtunical excision

**Q: What is Kogan's method for Clitoroplasty?**

A: Doing Schmid's Technique through lateral 3' o clock & 9 'o clock approach

(With subtunical excision of corpora)

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What is Baskin's op<sup>n</sup> for Clitoroplasty?**

A: Doing Schmid's technique through two separate ventral incision 5 o'clock & 7-o' clock

### **Q: What is Pippi-salle op<sup>n</sup> for Clitoroplasty?**

A: Same as Baskin's op<sup>n</sup>, but corpora cavernosa are not excised but are disassembled and buried under labial fat. This allows the pt to covert back to male in future use.

## **Vaginoplasty...**

### **Q: what are the types of vaginoplasty done?**

A:

1. Cut back vaginoplasty
2. Flap vaginoplasty
3. Pull through vaginoplasty
4. Complete Vaginal replacement

### **Q; what is Cut-back Vaginoplasty?**

A;

- Appropriate for only labial fusion
- Otherwise rarely used
- Fused labial folds are cut open

### **Q: What is a flap vaginoplasty & which flap it uses?**

A:

- Used for low fusion types
- Anterior vaginal wall is not touched
- Post vaginal wall is incised in mid-line & cut open
- Posterior based Perineal flap is advanced to cover the gap in post vaginal wall

The flap used is Lattimer perineal flap created using omega incision at perineum

### **Q: What is the name of perineal flap?**

A: Lattimer flap used for low fusion types

### **Q; what is pull through vaginoplasty?**

A: The anterior vaginal wall is separated from urethra and the vagina is pulled upto perineum and then fixed to skin

- Used for High vaginal confluence
- Hendren – Crawford op<sup>n</sup>
- In most cases vagina may not reach perineum so flaps may also be required

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is complete vaginal replacement?**

A: In-case of rudimentary / obliterated vagina

Vagina replaced by sigmoid colon

**Q: How will you reconstruct a vagina in a child of DSD?**

A:

- Modified BALDWIN -- Bowel neo vagina (using ileum) Good result, Functional coitus
- Mc Indoe- skin neo vagina -More chances of vaginal stenosis

---

### **FLAP VAGINOPLASTY**

(Low confluence – vaginoplasty)

**Indn:**

Low confluence

< 3 cm common channel urogenital sinus

**Pre Op**

-medically fit

-Metabolically fit; hormonal levels under control

-Antibiotics

-Stress dose steroids

-Morning electrolytes

**Anesthesia:** -G/A

**Step: 1**

- Endoscopy /Genitoscopy – confirm levels of confluence
- Deploy fogarty catheter in vagina
- Deploy Foleys in bladder

**Position:** Lithotomy

**Incision:**

1. Subcoronal incision Circumferencing incision from 7 o' clock to 5 o 'clock upto 12 o' clock (leaving strip between 5 & 7 clock)
  - Drop the incision lines vertically down
  - from 5 & 7 ' o clock to circumferate urethral office
  - (fig 134-39; page 3653,10<sup>th</sup> edition Campbell)
2. Omega shaped incision over perineum
  - take a holding stitch through glans
  - Deglove the clitoris

## **Neeraj Sharma's ...Notes For Urology Practicals**

- deepen the vertical lines
- open tunica by vertical incision @ 5 & 7 'o clock
- Do corporal excision
- Close tunica

- Omega flap is deepened & raised
- Posterior wall of vagina is separated from rectum
- The posterior wall of vagina is split in midline from the introitus to upto the level of normal vagina
- Posterior Based Lattimer flap is transposed in between the split ends of post vaginal wall
- Suturing of flap to vaginal wall done
- The mobilized glans is moved inferiorly towards the vagina
- Degloved clitoral (Phallic) skin is split in midline longitudinally
- It is brought down from both sides of clitoris to form clitoral hood
- The splayed open ends of clitoral skin are fixed on sides of vaginal introitus to work as labia minora.

### **Labioplasty**

- 'Y' shaped incision are made around the inferior aspects of labia majoras
- 'Y' is converted to 'V' ; thus bringing the edges of labia majora more towards anus and thus covering the new formed vagina

### **Q: How will you treat high fusion vaginal confluence?**

A: Hendren-Crawford – pull through operation

### **Q: What is the incidence of high fusion anomaly?**

A: 5% of total CAH cases

### **Q: Describe the pull through Vaginoplasty?**

A:

Step 1: Endoscopy + Fogarty in vagina + Foleys in Bladder

Step 2: Do Clitoroplasty as indicated

Step 3: Turn the child prone

- Make omega flap in perineum , raise the flap
- Dissect between urogenital sinus & rectum
- Move the rectum away
- Lay open the UGS posterior wall to visualize the anterior wall from inside  
Fig 134-42 A & B page 3656
- Incise between vaginal opening & urethral orifice (transverse incision) (fig 134-42 C)
- Tubularize the urethra (134-43 –A)
- Pull the vagina as low as possible (134-43 – B)

## **Neeraj Sharma's ...Notes For Urology Practicals**

Step 4: Turn the child supine

- Fix the posterior perineal based omega flap in the splayed open posterior vaginal wall

Step 5: Complete Vaginoplasty

Step 6: Complete Y-V Labioplasty

**Q: what is "Passerini –Glazel" Feminizing Genitoplasty?**

A: Passerini-Glazel feminizing Genitoplasty is a modified TUM+ pull through vaginoplasty in which urological sinus is completely mobilized (Total Urogenital sinus mobilization = TUM) and then opened in midline to form flaps & do vaginoplasty.

## **Cloacal anomaly correction...**

**Q: What is high & Low fusion?**

A: Common channel > 3 cm = high fusion

Common channel < 3 cm = low fusion

(Distance measured from perineum)

**Q: What is TUM Sx?**

**A: Total Urogenital Sinus Mobilization**

**Q: What is TUM & PUM?**

A: TUM is total urogenital sinus mobilization

- mobilization goes upto the level of above pubic symphysis

PUM is partial urogenital sinus mobilization

- In PUM mobilization is done upto the level of pubo- urethral ligament

**Q: How will you do 'TUM'?**

A: Steps:-

1. Genitoscopy + vaginal fogarty + Bladder Foleys
2. Clitoroplasty as indicated
3. Make a incision @ 6 o' clock (Transversely) Between UGS & rectum and push the rectum away
4. Circumferate the incision around UGS
  - Separate UGS – Posteriorly from rectum,
  - Laterally from pelvic attachment
  - Anteriorly mobilize upto pubic bone
  - cut the intervening pubo urethral ligament
  - dissect beyond the pubic symphysis.
5. UGS can be now pulled out of perineum
6. Split the posterior wall of UGS in midline upto where vaginal orifice comes



## **Neeraj Sharma's ...Notes For Urology Practicals**

7. Stitch the border of vagina to perineum
8. Split into posterior wall of vagina if needed (if distal vagina is rudimentary)
9. Now split the anterior wall of UGS upto urethra & stitch the urethra to perineum
10. The left & right leaves of UGS should not be discarded but should be used to make the mucosa lined vestibule or anterior or posterior vaginal wall
11. Complete Labioplasty

### **Outcome of genitoplasty surgeries...**

**Q: How can you measure the cosmetic & fn outcome of genitoplasty?**

**A:** Using Creighton score (or Sarah Creighton score)

Cosmetic Outcome is judged on the basis of following factors

- Post operative Clitoral size & position
- Post operative Vaginal Introitus depth and width
- Post operative Labial Appearance

The final outcome is then labeled as

- Good
- Satisfactory
- poor

F<sup>n</sup> outcome is assessed on the following-

- Bowel control
- Urinary control
- voiding pattern
- Size of vagina

**Case: 1**

A 3 month old child is presented by its parents with c/o Right empty hemiscrotum

ODP: Rt. empty hemiscrotum since birth

Left side hemiscrotum normal since birth

Rt. gonad has never been seen in hemiscrotum

C/o passing urine through the shaft of the penis & not through meatus since birth

No complaint of excessive crying / fever

No c/o vomiting; c/o passing stools regularly through anus

Birth H/O: LSCS –Birth @ 9 months, Cried immediately after birth, In NICU x 1 days

Wt: 1.9 kgs

Vaccination: up to date

Ante natal H/O : NAD

Past Med / PAST Sx H/O → NAD

Family H/O : Mother – NAD

Father – NAD

Sibling – none (first child)

Gen. Exam.

Ht-..... Pulse.....-BP-.....RS..... CVS.....

Wt- .....

Temp-.....

Examination

Umbilicus – centrally placed, no hernia

Abd wall – normal, musculature normal

Inguinal region: Right Testis not palpable in inguinal region  
Left Hernia +

Penis: Hooded prepuce  
Meatal opening @ penoscrotal junction  
Chordee +

Scrotum: left scrotum normal, Rugosity normal  
Testis 1x1 cm normal  
Consistency good  
Right hemi scrotum empty  
No nubbing felt

Anal Opening normal

Spine normal

**Q: What is your diagnosis?**

A:

1. As per national health consensus guidelines any child with NPT (non palpable Testis) + hypospadias is to be considered → DSD until otherwise proved.  
1<sup>st</sup> diagnosis DSD with Rt.NPT with Hypospadias + Hernia
2. Since One gonad is palpable = genotype is atleast 'Y' containing  
(NHC statement -2, → any palpable gonad is testis until otherwise proved)
3. It may be case of Isolated NPT with Hypospadias

**Q: How will you lx this child?**

A: I Will follow Grambuch protocol of DSD evaluation

G- Genital / Gonadal examination

U – USG

S \_ steroid 17 keto-steroids

Kary – Karyotype

Endocrine evaluation

**Q: USG is S/O uterus +, fallopian tube + on Right side, Now what next?**

A: Would like to proceed with 17-OH progesterone & karyotype

**Q: 17-OH progesterone normal, Karyotype = 46XY normal male, considering this, what are the D/Ds?**

A: Karyotype is 46XY

With one gonad (left) palpable

With Right gonad not Palpable + right fallopian tube / uterus +

so it is a case of Right Dysgenetic Testis like –mixed G.D, - Partial G.D,- Ovotestis

**Q: What is mixed gonadal Dysgenesis?**

A: One side Testis is present & normal

Contralateral Testis is dysgenetic; So MIS - , → fallopian tube + , uterus +

46XY / 45-XO/XY

**Q: what s partial gonadal dysgenesis?**

A: Both the gonads are dysgenetic to variable extent

46XX / 46 XX/ XY / 46XY

**Q: what is Ovo-Testis?**

A: atleast one of the Gonads will have features if both ovary & testis

**Q: How will you proceed now with provisional diagnosis of gonadal dysgenesis?**

A: Will do diagnostic Laparoscopy + Proceed

- To locate the Rt. NPT
- Take biopsy of Rt. NPT gonad
- Do Orchidopexy in same sitting or orchidectomy if the NPT is a streak gonad
- Close hernia defects of left side
- To excise the fallopian tube & uterus,

**Q: Laparoscopic findings are Rt. streak gonad (excised) & mullerian organs excised any thing else you want to do?**

A: As there are chances of left ovo-Testis; I will explore left testis & do Biopsy

- For confirmation / rule out ovo-testis
- Rule out ITGCN / Gonadoblastoma

---

## ***Case II***

16 yr old female presented with complaint of amenorrhea and small secondary sexual characteristics

Past H/O        }  
Family H/O     } NAD

Gen exam: tall Height, No webbed neck, No wide spaced nipples, No short height, No Cubitus Valgus

2<sup>nd</sup> sexual characteristics

- Breast Tanner -3
- Pubic Hair scant
- Axillary hair
- Fat distribution : not female type

Local Exam : Vagina +

Hymen + ,Labial Folds normal

No Inguinal mass/ swellings

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: with the given history what are your D/Ds?**

A: D/D –Turner XO, -AIS complete, -Pure gonadal dysgenesis

**Q: How will you proceed?**

A: Will follow Grambuch protocol

Genital → USG → Steroids → Karyotype

**Q: USG s/o NO uterus, No fallopian tubes, gonads not seen, What next?**

A: Since there are no mullerian structures (CAH ruled out)

I would like to go directly for karyotype

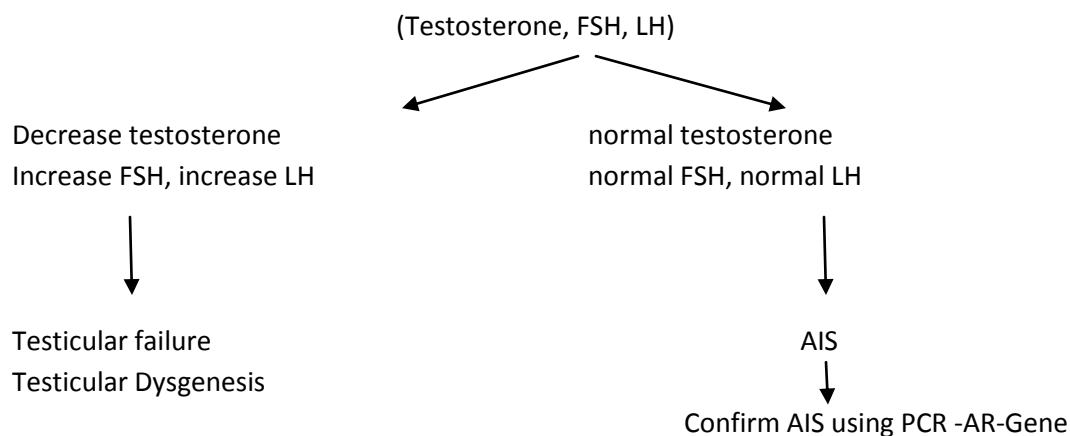
**Q: What are you expecting in karyotype?**

A: As there are no mullerian structures, I expect atleast one 'Y' chromosome

Since there is no phallus but vagina is present, I think testis are undescended and either non fn (dysgenetic) or receptors are non fn (AIS)

**Q: Karyotype is 46XY, when next?**

A : I will do hormonal analysis of pt



**Q: What is the next step of Mx?**

A: In Both AIS as well as gonadal Dysgenesis we have to do Gonadectomy to assign a proper female gender (in AIS) and prevent Gonadoblastoma (in gonadal dysgenesis) + OCP supplementation life long.

**Case III**

A 2 day old infant is being brought with suspected ambiguous genitalia

Birth H/O : 41 wk gestation / FTND/ no Complication

Ante natal H/O }  
Maternal H/O } nil  
Paternal H/O }

Examination → Stretched penile length 2.5cm  
Dorsal Hooded prepuce

Inter labial opening → one

- Labia minor & majora not fused
- No rugosities over labia majora

Gonads: left gonad palpable

Anus normal

Spine normal

**Q: Why do you think the child is abnormal / DSD?**

A: Long phallus + Vagina → Abnormal

Vagina + Palpable Gonad → Abnormal

Child has long phallus + vagina + Palpable gonad

**Q: What is your provisional Diagnosis?**

A: Since one gonad is palpable, I think in terms of at least one 'Y' in karyotype

Either pure male – 46XY

Or Gonadal Dysgenesis

Since Phallus is long & vagina is present CAH may also be a possibility

**Q: How will you I<sub>x</sub> this child?**

A: By following Grambsch protocol

GUS-Kary

**Q: USG s/o: midline uterus present behind the bladder what does this tell you?**

A: Child is either CAH/or gonadal dysgenesis

I would like to do sr. 17-OH progesterone levels

**Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Sr. 17-OH values are normal, what next**

A: Karyotype

**Q: Karyotype is 45XO / 46XY<sup>0</sup> mosaic form, now what will you next?**

A: Diagnostic lap + Gonadectomy

(as the child is having dysfunction gonads)

***Neeraj Sharma's-  
NOTES FOR UROLOGY PRACTICALS***

**Posterior urethral valve**



29 day old male infant is brought to the pediatric department for crying while voiding and mild fever x 2 days

The neonate was born by FTND with 2.1 kg birth weight and immediate cry

Mother is well otherwise

No congenital Abnormal in child

Poor feeding since birth

Fever x 2 days

Past H/o → NAD

Family H/o → NAD

On examination

- APGAR = 10
- Wt = 2.3 kg
- Bladder palpable
- Ext. Genitalia – normal, anus normal, spine exam normal

A 5 Fch infant feeding tube passed easily and 50 ml of clear urine drained

**Q: What is Apgar score?**

**A:**

- Appearance skin
- Pulse rate
- Grimace to pinch
- Activity of muscle
- Respiration

**Q: what is the normal capacity of bladder?**

**A:**

- For age > 1 yr → Koff's formula - bladder capacity (ml) = (Age (yrs) + 2 ) x 30
- Thus for a 3 yr old child bladder capacity = (3+2)x30=150 ml
- For infants → Homdal's formula- bladder capacity (ml) = (age (in months) x 2.5 ) +38
- Thus for a 4 month old child bladder capacity = (4x2.5)+38=48 ml
- Simplified.-bladder capacity (in ml) =7 x body weight (kg)..used by pediatricians

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the incidence of PUV?**

A: 1 in 8000, males only

**Q: who classified PUV valves?**

A: Young's classification

- Type 1 – anterior (distal) to Verumontanum – 95%
- Type 2 – Posterior (proximal) Verumontanum
- Type 3 – Distal to Verumontanum → 5% → membrane with a hole

**Q: what is special about type -2 valves?**

A:

- Young described a type II valve as arising from the Verumontanum and extending along the posterior urethral wall toward the bladder neck.
- These type II folds are not obstructive and probably result from hypertrophy of muscles of the superficial trigone and prostatic urethra in response to high voiding pressure from distal obstruction.
- They can be seen in response to many obstructive conditions such as urethral strictures, posterior urethral valves, anterior urethral valves, and detrusor-sphincter dyssynergia.
- These type II folds are no longer referred to as valves.

**Q: what is special about type -3 valves?**

A:

- membrane lying transversely across the urethra with a small perforation near its center
- The membrane is distal to the verumontanum and sometimes is elongated like a wind sock reaching the bulbous urethra

**Q: what is a windsock valve?**

A: type -3 valve is also called wind sock valve



**Q: what is a Type IV valve described?**

A: dilated kinked urethra in prune belly syndrome

**Q: what is the composition of these valves?**

A: they are not true valves but are flaps of mucous membranes

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is the embryology of PUV valves?**

A: there are many speculations about exact cause for PUV formation

1. Abnormal insertion of mesonephric duct
2. Abnormal ureteric Bud
3. Persistence of cloacal membrane at urogenital sinus.

### **Q: what is the timing of formation of PUV?**

A: 8<sup>th</sup> wk of life. MIS starts to act by 8<sup>th</sup> wk and formation of phallus starts at 8-9 wk

### **Q: what are the physiological changes due to PUV?**

A: valve at the level of veru → obstruction at the level of veru → bladder forcing out urine against obstruction → dilation of posterior/prostatic urethra → high pressure voiding → VUR / back pressure changes in kidneys.

### **Q: what are the Pathological changes in PUV?**

A:

- Kidney: Glomerular injury, Tubular injury, Obstructive uropathy, microcystic dysplasia
- Ureter : VUR/ Dilated/ tortuous
- Bladder: Distended / Thick walled / Trabeculated
- Bladder neck: hypertrophied / elevated

### **Q: what is the worry in PUV?**

A:

- Hypoplastic lungs
- Long term effects on bladder
- Kidney dysfunction

### **Q: what are the common presentation modes?**

A:

- fetal – antenatal detection on USG
- Neonates: Potter facies, ascitis, abdominal mass, Respiratory distress, poor muscle tone, failure to thrive, lethargy, edema, pale, decreased u/o, weak stream
- Older Children: decreased urine stream UTI, Voiding dysfn, frequency, straining to void

### **Q: When will you do USG in Antenatal period?**

A: according to IAOG ( Indian Association of Obs & Gyne)

- 7<sup>th</sup> week – confirm pregnancy
- 11<sup>th</sup> week – gross abnormality
- 18-22 week – gross abnormality in development
- 24-28 week PUV
- 37<sup>th</sup> week – Oligohydroaminoes

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: when can you detect PUV antenatally?**

A: On 24<sup>th</sup> wk USG

**Q: what is seen in antenatal USG?**

A:

- Key hole sign
- Dilated thickened bladder
- Dilated thickened prostatic urethra
- Hyperechoic kidneys with HUN
- Bladder wall thickened = >5mm (n= 3mm) Distended / Thick walled / Trabeculated
- dilation of prostatic urethra

**Q: why are kidneys hyperechoic?**

A: Due to obstructive uropathy and Dysplasia

**Q: what are the grades of antenatal HN?**

A:

HN degree	2 <sup>nd</sup> Trimester	3 <sup>rd</sup> Trimester
mild	4-7 mm AP diameter	4-9 mm AP diameter
moderate	7-10 mm	9-15 mm
severe	>10 mm	>15 mm

**Q: At what level is this measurement taken?**

A: A-P diameter is measured at the level of hilar lips

**Q: What are the criteria for Oligohydroamniotes?**

A:

- Amniotic fluid < 500ml at 8<sup>th</sup> month
- Depth of single largest pocket < 2 cm
- Amniotic fluid index AFI <5

**Q: from where is the amniotic fluid produced?**

A

- Amniotic fluid → upto 16 wk from placenta,
- After 16 wk from fetal kidneys as a part of urine

**Q: how can you clinically suspect PUV in antenatal period?**

A: mother abdominal distension is less than normal

Fetal organs palpable from outside

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What the criteria for ANTENATAL intervention in PUV?**

A:

- Features s/o BOO
- Single fetus
- Male fetus
- Normal karyotype
- No congenital abnormality
- Oligohydroamniotic early onset
- Fetal urine-  $\text{Na}^+ < 100 \text{ mg/dl}$
- Fetal urine -  $\text{Cl}^+ < 110 \text{ mg/dl}$
- Fetal urine Osm  $< 210 \text{ m Osm/dl}$
- Fetal urine -Beta 2 microglobulin  $< 10\text{-}20$

**Q: how will you measure these fetal urine values?**

A: by amniocentesis, amniotic fluid is nothing but fetal urine equivalent.

**Q: what do these fetal urine values imply?**

A:

- Fetal urine-  $\text{Na}^+ < 100 \text{ mg/dl}$ ...kidneys still have capacity to conserve sodium in body
- Fetal urine -  $\text{Cl}^+ < 110 \text{ mg/dl}$ ... kidneys still have capacity to conserve chloride in body
- Fetal urine Osm  $< 210 \text{ m Osm/dl}$ ... kidneys still have capacity to maintain urine osmolality
- If fetal kidneys can conserve sodium, chloride and osmolality ,these kidneys are worth saving

**Q: what intervention can be done antenatally?**

A:

- Vesicoamniotic Shunt can be deployed using Seldinger's Technique.
- It involves the placement of a double pig-tailed catheter (either Rodeck/Rocket or Harrison shunts) under ultrasound guidance and local anaesthesia, with the distal end in the fetal bladder and the proximal end in the amniotic cavity to allow drainage of fetal urine
- Please read : **Vesicoamniotic shunting for fetal lower urinary tract obstruction: an overview**  
R K Morris, PMID: PMC2675321 Arch Dis Child Fetal Neonatal Ed. 2007

**Q: what is the name of this Vesico- amniotic Shunt?**

A: Rodeck Shunt

**Q: what other shunt can be used?**

A: Harrison shunts

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Suppose it does not improve the condition and Oligohydroaminoes persists then?**

A: amino infusion (amino – infusion)

500 -800 ml warm saline @ every wk till delivery.

**Q: what are the D/Ds of antenatal HN (B/L)?**

A:

- PUV
- B/L PUJ<sup>n</sup> obstruction
- B/L VUR
- Urethral atresia or Anterior urethral obstruction.
- B/L VUJ<sup>n</sup> Obstruction

**Q: what are other anomalies a/w PUV?**

A:

1. VUR
2. PUJ<sup>n</sup> obstruction
3. Renal microcystic dysplasia
4. Pulmonary hypoplasia

---

## ***After birth management...***

**Q: What are the causes of BOO in child?**

A;

- PUV
- Ant. Urethral valve
- Urethral polyp
- Urethral stricture
- Meatal Stenosis
- Phimosis

**Q: When will you do USG in post rated period?**

A: Unilateral HN → 3-7 days

Bilateral HN → Immediately after Birth (0-3 days)

**Q: What is SFU Grading?**

A: SFU

- Grade 0 ; No splitting
- Grade 1: Urine in pelvis, barely splits sinus
- Grade 2: Urine fill intra renal pelvis / external pelvis, major calyces dilated
- Grade 3: SFU grade 2 + minor calyces dilated + parenchyma preserved
- Grade 4: SFU Grade 3 + parenchyma lost

**Q: how will you manage the Neonate?**

A:

Day-0

- Keep child in NICU Care
- USG
- Introduce a 5 Fch infant feeding tube → Drain urine – send for urine culture→start antibiotics
- Blood I<sub>x</sub> – serum electrolytes, ABG
- I.V. fluid, correct electrolytes, watch for acidosis and hyperkalemia

Day-1:

- Maintain child's hydration and nutrition
- Repeat blood I<sub>x</sub>

Day-2→ USG abdomen + VCUG → confirm the diagnosis→ Reintroduce feeding tube

Day-3, Day4 - Maintain child's hydration and nutrition

Day-5 → Definitive valve ablation

**Q: will the infant feeding tube go easily?**

A: usually yes, because it's a one way valve, but sometimes infant feeding tube may not go due to a hypertrophied bladder neck. In such cases Terumo glide wire can be used for inserting feeding tube. Fix using micropore, no stitches

**Q: why can't you deploy foley's catheter?**

A:

- Can block ureteric orifice
- Leads to severe bladder spasms

**Q: why can't you do PUV fulguration on day -1 itself?**

A:

- child usually has electrolyte disturbance ,watch for acidosis and hyperkalemia
- Diagnosis is not confirmed

**Q: how will you do VCUG in the neonate?**

A:

- Infant feeding tube is usually already deployed to the neonate
- Fill bladder with diluted contrast as per the capacity (in ml) calculated =7 x body weight (kg)
- Child will void spontaneously because of primitive bladder micturition reflex
- Shoot x-ray while voiding
- It is advisable to use dynamic fluoroscopy

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what if the child doesnot void immediately?**

A:

- we in our institute wait for the child to void
- Do not try to overfill the bladder
- We don't use supra pubic pressures using wooden scale or thumb etc

**Q: What is 'P' sign and 'C' sign on VCUG?**

A: 'C' – Urinoma around kidney

'P' – Urinoma descends upto upper ureter & surrounds kidney also

} On VCUG

**Q: on which day will you assess serum creatinine?**

A: day-3

**Q: on which day will you do PUV fulguration?**

A: around day -5, provided serum electrolytes are normal

**Q: What famous protocol can be followed for management of neonates having PUV?**

A: Gangopadhyay protocol

**Q; how do you fulgurate the PUV?**

A: we in our institute use holmium laser

**Q: what other instruments can you use for PUV fulguration?**

A:

- bugbee electrode
- Laser
- cold knife with Resectoscope
- VIU Sacche's set pediatric
- balloon catheter
- Whitaker's hook
- Mohan's hook
- chooramani valve ablator

**Q: what Indian names are associated with valve ablaters?**

A:

- Mohan's hook
- chooramani valve ablator

**Q: what if baby is too small for instrumentation?**

A: Do blind valvotomy under IITV guidance using Whitaker hook or chooramani valve ablator



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How do you do this blind valvotomy?**

A:

- Under IITV – do static VCUG through Feeding tube
- remove I.F tube → 'screen' → see the location of PUV
- Pass valve ablator through RGC as sheath → go till urine comes
- Slowly Withdraw the whole assembly under iitv coverage this leads to mechanical destruction of valves
- Repeat procedure if needed
- Deploy infant feeding tube again

**Q: how will make sure that complete valvotomy is achieved by blind valvotomy?**

A:

- It is mandatory to do a check urethroscopy as soon as child urethra is big enough for taking Resectoscope, usually by the age of 3 months, if initially a blind procedure is done
- clinically improvement in urinary stream

**Q: What are pediatric resectoscopes available?**

A:

- Wolf- 9 F resectoscopes
- Karl storz – 11 Fch & 13 Fch Resectoscope

**Q: describe the procedure for PUV FULGURATION?**

A:

- under G/A give lithotomy position
- Do urethrocystoscopy using pediatric cystoscope
- Fill the bladder and then stop inflow channel
- Slowly withdraw the scope out of bladder keeping the inflow channel closed
- Give a little suprapubic pressure
- Valve will be seen as whitish ,pearlish curtain across the lumen
- Change the system to resectoscope, use saline for cold knife or change to Glycine for hot energy ablation
- Repeat the above procedure and once the valves are seen ablate using cold/hot knife
- Deploy the infant feeding tube again
- It is advisable to do circumcision if reflux is present on VCUG

**Q: What is the ideal wt of child for PUV fulg<sup>n</sup>?**

A; Atleast 3 kg required for endoscopic instrument and anaesthesia

**Q: how will you give lithotomy position to the child?**

A: bring the child to the caudal edge of the table and put half litre saline bottle under the popliteal fossas to give lithotomy position

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: which energy do you use for ablation?**

A: bugbee can be used or cold knife can also be used

**Q: what is the aim of valve resection –to excise the valves or incise the valves?**

A: to incise the valves such that they lie freely along the walls

**Q: what is the disadvantage of using bugbee electrode?**

A: hot energy ablation may lead to stricture formation

**Q: How long will you keep infant feeding tube/ Catheter post operatively?**

A: 48 hrs

**Q: what medications will you give to this child post operatively?**

A:

antibiotics for 5 days

oxybutinin for 5 months initially

**Q: what are the complications of valve ablation?**

A:

- Urethral Bleeding
- Septicemia
- Urinary Incomplete drainage
- Incontinence
- Stricture

**Q: How will you know PUV fulguration is adequate?**

A:

On VCUG → post urethra should not be twice more dilated than anterior urethra

On USG → decreased HN

On Blood I<sub>x</sub> → Decreasing sr. creatinine

Gen Condn. → Improves / Playful child/ weight gain / good feeding acceptance.

**Q: How will a toddler present for PUV?**

A:

- Diurnal enuresis
- Dribbling
- Weak Stream
- UTI

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what opn is must accompanied with PUV fulguration**

A: If reflux in + in Base line VCUG @ day 5 then CIRCUMCISION is must.

**Q: How will fl/up this patient?**

A:

- Immediate post op period-
  - Measure urine output Watch for post obstructive diuresis
  - Sr. Creatinine (gradually falling)
  - Serum electrolytes
- Blood urea, sr.creat, urine routine @ 1mo for 1<sup>st</sup> year
  - @3mo x 2 years
  - @6 mo x upto 5 yr
- Abdominal USG
  - @ 1 mo x 3 months
  - @ 3mo x 6 month
  - @ 6 mo x 1 yr
  - @2 yr x 5 yr
- VCUG - at 3 months Baseline
  - Check for complete ablation of valve

**Q: What is the expected Sr. creatinine nadir?**

A: less than 0.8 is normal

**Q: What is normal creatinine of child?**

A; 0.4

**Q: suppose while doing PUV fulguration, you observe that bladder neck is too high, then what will you do?**

A: don't do TUBNI. Put the child on alpha blockers

**Q: what is the role of TUBNI?**

A: If child is still obstructed after PUV fulguration → VCUG showing obstruction at bladder neck  
After the failed trial of alpha-blockers

**Q: How will you proceed in toddlers?**

A:

- a) Initial assessment → Do USG + PVRU
- b) Establishing the Diagnosis → VCUG
- c) Treatment → Valve fulguration + Catheterization
- d) post op management → Post obstructive Diuresis management

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is anterior urethral valve?**

A

- Appear as ant. Urethral diverticulum
- Due to defects in spongiosum
- Diverticulum body obstructs the urethral outflow due to compact space
- Functions as ant. Urethral valve

**Q: How will you manage these urethral diverticulae?**

A; small neck – Transurethral incision

Larger diverticulum– Open reconstruction

**Q: what will you do if Sr. Creatinine doesn't fall or nadir is high?**

A: Vesicostomy (18 – 20F stoma)

**Q: what is the technique called?**

A: Blocksom Technique of cutaneous vesicostomy

**Q: what are the indications for cutaneous vesicostomy?**

A: presently a rarely done operation, but the indications are

- High nadir creatinine > 2.0 mg/dl even after PUV fulguration
- Too small infant for instrumentation
- Pediatric instrument not available
- Too sick/ ill child

**Q: Where is vesicostomy done?**

A: at the dome of bladder

**Q: What if it is still not improving after vesicostomy?**

A; ask mother to keep over night tube in vesicostomy

**Q: What is the worry with vesicostomy?**

A: Bladder recycling & Bldr Rehabilitation

**Q: when will you do isotope scan?**

A: at 1 year of age

**Q: what are the Indications for DMSA scan?**

A: not needed as such in most of the conditions

- Assess Baseline renal fn
- Split renal fn
- USG s/o renal dysplasia

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Ultrasound s/o loss of CMD
- Ultrasound s/o persistent HN

**Q: What if child is still not improving after keeping overnight tube in vesicostomy?**

A: Bilateral 'Low' Ureterostomies '

Indications are →

- Creatinine >2.0,
- recurrent infection, pyuria
- Persistent HN /HUN

**Q: what is the best ureterostomy?**

A: loop ureterostomy done bilaterally

**Q: When will you do reconstruct (internalize) these Ureterostomies?**

A: at the age of 5 yr

- Do DMSA & VCUG
- Assess bladder capacity
- Do Uro Dynamic Examination(UDE) if needed

**Q: what are the Indications for UDE?**

A:

- Sr. Creat b/w 2-5 mg/dl even after Complete valve ablation & good stream
- LUTS
- Supra pubic pain/cramps

**Q: What is COPUM?**

A:

- Congenital Obstructive Post Urethral Membrane
- Coined by Deewan
- Basis –all PUV are of same morphology & hence young's classification is useless & baseless

**Q: what do you meant to achieve in the treatment of PUV?**

A:

- Sr. creatinine <0.8 mg/dl @ 1 yr age (WARSHAW's criteria)
- Resolution of VUR
- Safe kidneys

**Q: What % of PUV patients will have VUR?**

A: 50-70% - secondary reflux

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Which Reflux is more likely to resolve- unilateral or bilateral?**

A: Bilateral; (but as such unilateral has good prognosis → pop- off mechanism)

**Q: why VUR needs to be treated?**

A:

- Recurrent UTI
- Need for Antibiotics
- Affects growth of child
- Kidney scarring
- nephron loss

**Q: what is the relationship b/w VUR & PUV?**

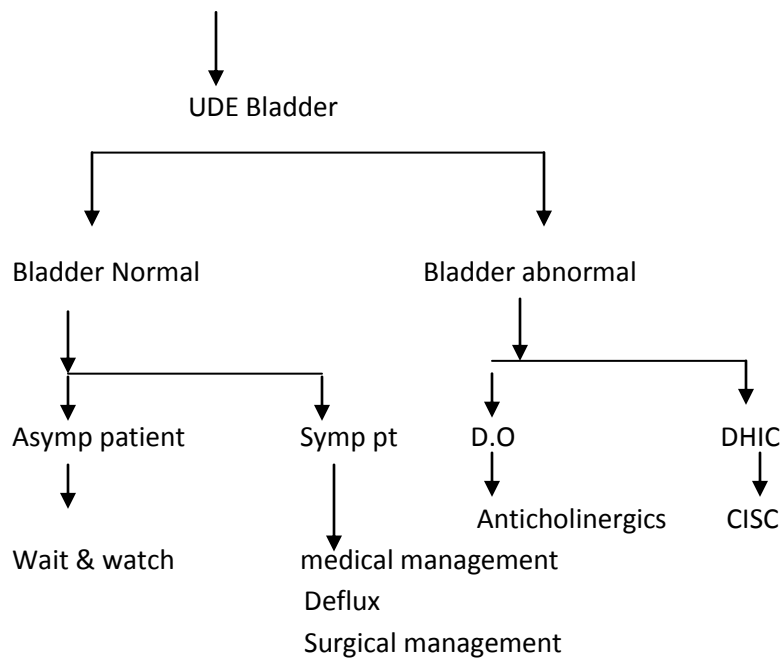
A; 50% of PUV pts will have reflux

After valve ablation 50% resolution of Reflux

**Q: how will you manage VUR?**

A:

Step 1 Repeat VCUG → confirms the complete valve ablation and reflux status



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you do UDE in a child?**

A:

- As institutional policy we don't do UDE until the child is toilet trained, usually by the age of 3 years.
- Till then we empirically give oxybutinin to the child having dysfunctional void
- A laxative or stool softener is generally supplemented in the treatment
- Plenty of liquids advised
- If still needed for a child age 1-3 yr → UDE is done under anaesthesia

**Q: What phase will you see in UDE?**

A: filling Phase for over activity

**Q: what will you make child void under Anaesthesia?**

A:

- Ask anesthetist to lighten the anaesthesia & child will void by itself
- Or crede's maneuver

**Q: what are the UDE patterns in PUV child?**

A: Peter's UDE Pattern

- Myogenic failure
- Detrusor hyperreflexia
- Low capacity /decreased compliance

**Q: What will you do for D.O?**

A: Anticholinergics

- Oral, patch, gel,
- Intravesical

**Q: what are the strategies to deal with VUR**

A:

- 1) Anticholinergics
- 2) CIC
- 3) Refluxing loop ureterostomy
- 4) Augmentation

**Q: what is the best time to do surgery for VUR?**

A: Prior to renal transplantation

## **VALVE BLADDER**

**Q: what is valve bladder?**

A:

- Term coined by Mitchell
- a chronic condition in valve patients where despite successful valve ablation, intrinsic bladder dysfunction leads to deterioration of the upper urinary tracts and incontinence (Mitchell, 1982).

**Q: what are the components of a valve bladder?**

A:

- Poor filling sensations
- Large capacity bladder
- High storage pressure

The combination of poor sensation, high bladder volumes and poor compliance produce storage pressures, high enough to prevent adequate drainage of the upper tracts.

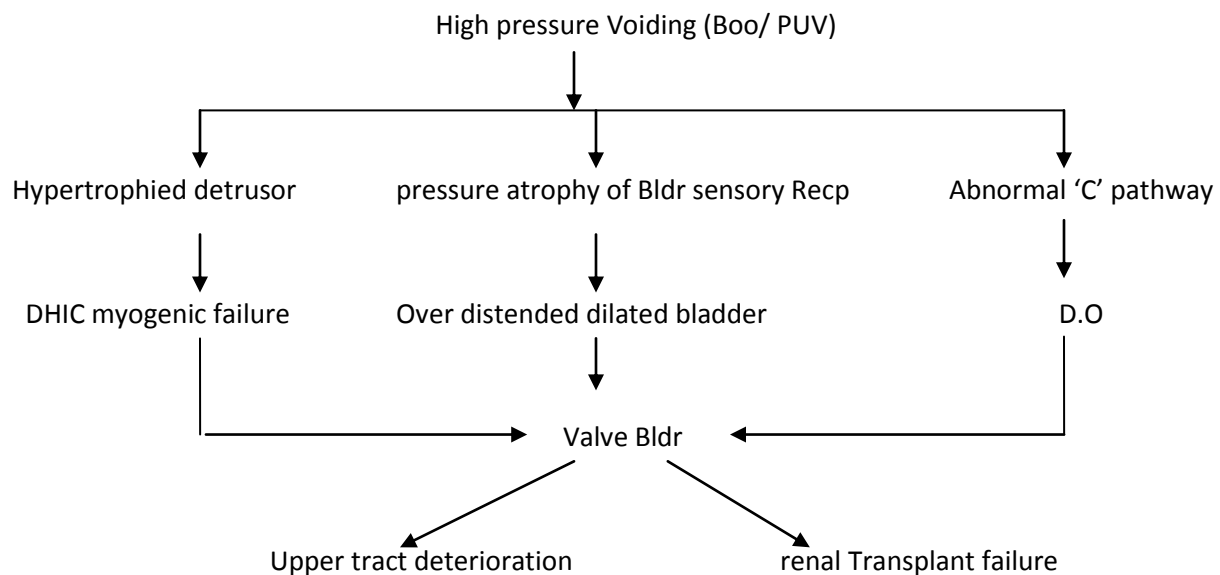
**Q: what are the typical patient characteristics clinically?**

A:

- These boys are comfortable with large bladder volumes at high pressures.
- They frequently have overflow incontinence and void infrequently and incompletely.

**Q: What is the Pathophysiology behind valve bladder?**

A:





## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is Glassberg classification of upper tracts in valve bladder?**

A: **Glassberg** Classification of upper tracts in valve bladder

- Type 1: drain independent of Bladder volume
- Type 2: drain only when Bladder is empty
- Type 3 : Obstructed always independent of Bladder volume

**Q: what are the major clinical presentations?**

A:

- Incontinence
- Frequency, LUTS, Nocturia,
- Stone
- Upper tract deterioration

**Q: Why incontinence occurs in valve bladder?**

A: Multifactorial

- Polyuria (tubular damage) → Nephrogenic diabetes Insipidus → Urine output > 5-6 litre /day
- Poor bladder sensation – over filling
- Detrusor instability
- Poor compliance

**Q: what is the state of valve bladder w.r.t age of the patient?**

A:

- Infant → poor compliance
- Toddler → Hyper contractile
- Post Puberty → Myogenic failure

**Q: what is the management of valve Bladder?**

A:

1. Symptomatic Management
  - Bladder training
  - timed voiding and Double void
  - Alpha Blockers (bladder neck relaxation)
  - CIC + continuous bladder drainage in night
2. Management of Bladder Dysf<sup>n</sup>
  - D.O → anticholinergics
  - Small poor complaint bladder → anticholinergics + augmentation
  - Myogenic failure – CIC, continuous bladder drainage , Mitrofinoff
3. End stage bladder →
  - Vesicostomy
  - upper tract diversion
  - ileal conduit

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the prognostic indicators of renal function?**

A: following are the factors depicting poor prognosis

- Age of presentation >1 yr
- VUR (Reflux)
- USG appearance – renal dysplasia
- Nadir creatinine > 0.8 @ 1 yr

**Q: what are the 'POP off' in PUV?**

A:

- Urinary ascitis
- Bladder diverticulum
- VUR

**Q: How to measure GFR for children?**

A: Schwartz formula ---  $eGFR = K \times \text{Height(cm)} / \text{Serum creatinine (K} \approx 0.5)$

**Q: How to measure GFR in adults?**

Cockcroft Gault formula

$$e\text{-GFR} = \frac{(140 - \text{age}) \times \text{mass (in kg)} \times (0.85 \text{ if female})}{72 \times \text{sr.creat (mg/dl)}}$$

**Q: what is the cause of renal failure in PUV valve bladder?**

A

1. Renal dysplasia (Irreversible)
2. Obstructive uropathy (reversible)
3. Hyper filtration injury
4. UIT / reflux/ Pyelonephritis
5. HTN

**Q: what are the prognostic indicators for renal f<sup>n</sup> in PUV?**

A:

- USG appearance of kidney → more dysplastic → poor outcome
  - Serum creatinine < 0.8 @ 1 yr
  - Age at diagnosis (age < 1 yr) = poor prognosis
  - Presence of reflux (more reflux → poor prognosis)
- } WARSHAW'S criteria

**Q: what are the indn for Bladder augmentation?**

A:

- poor compliance of Bladder,
- failed medical Mx /anticholinergics
- Repeated UTI
- Persisting VUR Threatening kidney fn, ↓GFR

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What augmentation will you do?**

A: clam cystoplasty/ mitrofinoff

**Q: what is the problem with augmentation?**

A: life long, metabolic complications

**Q: when will you do augmentation cystoplasty w.r.t renal transplantation?**

A;

It can be done before the renal transplant

- Adv : post op healing in better without immunosuppression
- Dis adv: Dry Cystoplasty, need saline washes

It can be done after the renal transplant:

- Adv: No fear of dry cystoplasty
- Dis adv: Poor healing

We in our institute do the bladder augmentation before the Transplant. FI/by regular bladder washes to rehabilitate bladder

**Q: will you do VUR surgery at the time of bladder augmentation?**

A: yes, if reflux is present than Vur surgery can be done along with bladder augmentation

**Q: What type of ureteric Re-implantation is preferred in Trabaculated bladder?**

A: Lich-Gregor extra vesical Technique. Do Bilateral ureteric re-implantation.

**Q: what is the dis adv of Lich-Gregor extra vesical Technique?**

A; needs mobilization at the back of the bladder

Leads to voiding disturbances temporarily → due to neuropraxia

**Q: How is the sexual life of a pt of PUV?**

A: Erectile dysfunction 5 -7 %

- Due to ESRD
- Due to dilated post urethera

**Q: what % of PUV pts will have valve bladder syndrome?**

A; 35-70%

**Transplant in a pediatric patient**

**Q; what % PUV pts will have CRF /ESRD?**

A: 50% of PUV pts will have CRF /ESRD

**Q; what is the mean age of ESRD in PUV pt?**

A: 15 – 20 years

**Q: What if the PUV child reaches ESRD?**

A: Put on CAPD → Renal Transplant

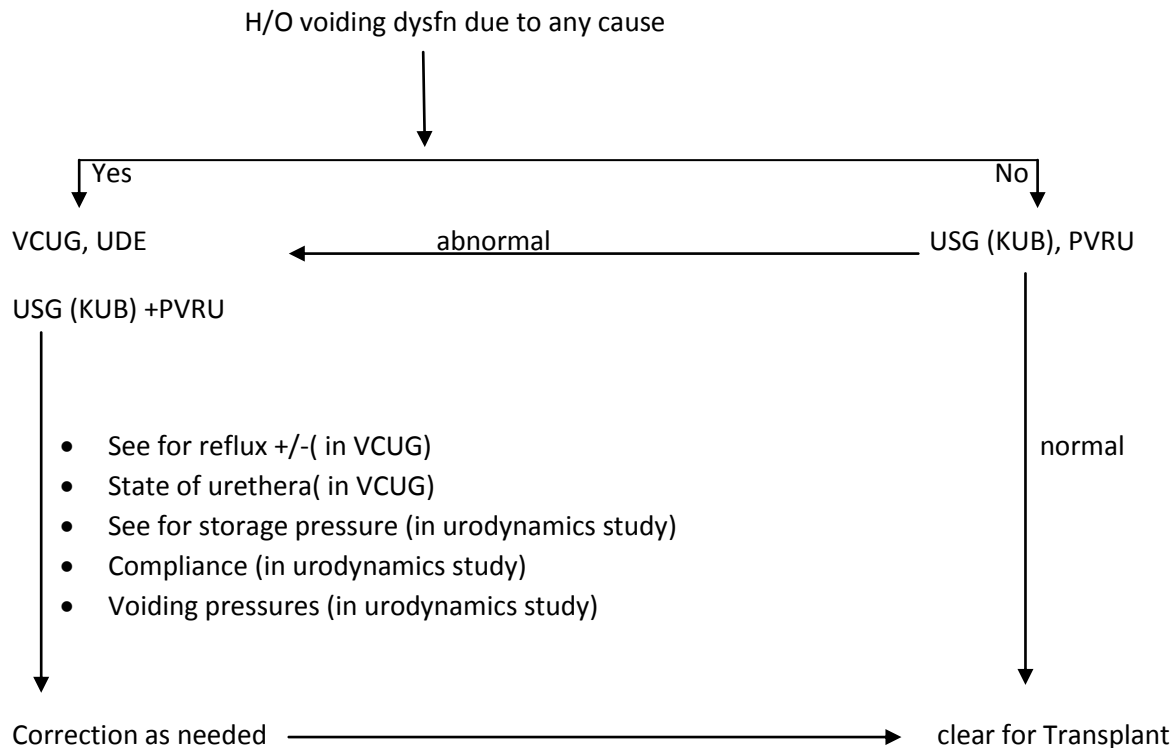
**Q: what are the major indications for renal Tx in kids?**

A:

1. Congenital obstruction (PUV) In young /teenagers
  2. Reflux nephropathy
  3. Neurogenic bladder
- } in adults

**Q: what are the basic Ix needed for Pre Transplant evaluation?**

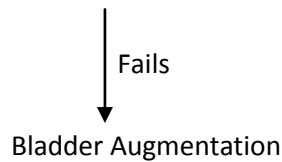
A: Proper History with history of PUV, VUR, Neurogenic bladder and treatment taken there of-



**Q: what is the most common bladder abnormality a/w VURD?**

A: low capacity – hypertonic – poor compliance

Management → CIC + anticholinergics



**Q: what is the goal of hypertonic bladder management?**

A: To be able to hold to capacity (as defined by age of child) at a pressure < 30 cm H<sub>2</sub>O

**Q: what are the indn for bladder augmentation?**

A:

1. Severely diseased / fibrosed bladder which has a poor capacity.
2. Capacity normal but unsafe storage pressures (failure to maintain a storage pressure of <30 cm H<sub>2</sub>O for atleast 3Hrs)
3. Failed trial of CIC and anticholinergics.

**Q: what type of bladder augmentation is done?**

A:

- If child / parents agree for per-urethral CIC than clam cystoplasty type of augmented patch
- If child / parents are non-compliant for per-urethral CIC than continent catheterizable stoma / mitrofanoff.

**Q: what should be the frequency of CIC?**

A: @ 3 hrs in children

@ 4 hrs in adults

**Q: who described CISC?**

A: Lapedes et al

**Q: What is bladder cycling?**

A:

- In case of defunctionalized bladder, CIC is done and saline introduced in quantity as per age.
- Dwell time of 3-4 hrs and then again CIC to drain.
- Amount of saline introduced and the dwell time may be increased slowly gradually.
- Ability to empty spontaneously should be assessed.

**Q: what is the usual mode of dialysis in kids?**

A: CAPD

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what should be the ideal timing for augmentation?**

A: anywhere between 3-6 months before Transplant

**Q: will you do native Nephrectomy NNx?**

A: Generally not required; until otherwise indicated

**Q: when will you do of native kidney?**

A: Nephrectomy if symptomatic / UTI/ Pyonephrosis

**Q: what are the indn for native Nephrectomy NNx?**

A:

1. Malignant HTN
2. Severer proteinurea leading to malnutrition
3. Recurrent UTI
4. High grade reflux → interfering with bladder cycling.

**Q: what special care is warranted w.r.t dialysis during NNx?**

A: peritoneal dialysis (CAPD) cannot be continued peri operatively in cases undergoing NNx, due to

1. Compln of urinary leak through incision & port sites (even in total retroperitoneal approach)
2. Chances of infn from skin to peritoneum
3. Thus child requires H.D (Hemodialysis)
4. H.D. may require formation of A.V fistula

**Q: what will happen to Native kidneys after Transplant?**

A: The native kidneys will automatically regress in size & output.

**Q: Can NNx be combined with renal Tx?**

A: yes, but better avoided in children, as it increases morbidity

**Q: What is the ideal weight for Transplant?**

A: Minimum 15-20 kg

In Less than 15 kg, transplant is not advisable



***Neeraj Sharma's-  
NOTES FOR UROLOGY PRACTICALS***

**Vesico-Ureteric Reflux**



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**VUR- basics- incidence pathophysiology**

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**Q: who described pathophysiology of reflux?**

A: Ransley & Risdon

**Q: what is VUR?**

A: VUR is the reflux of urine from bladder back into ureter

**Q: what is the incidence of VUR?**

A:

- 1<sup>st</sup> year – 70% of UTI pts
- upto 1 yr incidence is more in males after 1 yr of age incidence is more in females
- By 5 yr incidence reduces to 20% of UTI patients
- 1-2 % of asymptomatic children have reflux

**Q: what are the chances of hereditary involvement in reflux patients?**

A:

Twins	100%
Older sibling	11%
Younger sibling	33-44%
Father → son	66% chances

**Q: what can be the genes involved in pathophysiology of VUR?**

A: mutations of following genes are hypothesized in pathophysiology of VUR

- pax-2 (chr-10),
- Gdnf (glial derivative neurotrophic factor) –
- RET (RET is the receptor for GDNF)

**Q: What is CAKUT?**

A: congenital abnormalities of kidney & urinary Tract:

VUR is a part of CAKUT

**Q: what is Paquin's ratio?**

A: 5:1,

Tunnel/ureteric diameter = 5/1

**Q: what is the intravesical ureteric length?**

A:

1-6 yr = 6mm

6-9 yr = 9mm

9-12yr = 12mm

12 year and above= 15 mm

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what are the types of reflux?**

A: Primary reflux: when VUJn is primary at fault

Secondary reflux; when VUJn is normal but reflux is due to high pressure in bladder

### **Q: what happens in primary reflux?**

A: Paquin's ratio is altered

Usually intramural length is less

### **Q: what are the causes of secondary reflux?**

A: BOO→

1. PUV -50-70 % of PUV have reflux
2. Ureterocele → due to ureteroceles which block bladder neck
3. spina bifida /sacral dysmorphism
4. Dysfn Bladder
5. Bowel –Bladder dysfn (BBD)
6. Constipation

### **Q: what is the cut off bladder pressure for VUR?**

A: 40 cm H<sub>2</sub>O @ full Bladder

### **Q: how is reflux associated with UTI?**

A: reflux mechanically delivers the infected urine to renal pelvis

Significant HN and HUN acts as reservoir of infected urine

Bacterial endotoxins paralyse the ureteric peristalsis

### **Q: Who described the grading of reflux?**

A: Labowitz grading of reflux

### **Q: what are the grades of Reflux?**

A: International reflux study committee classification (Labowitz)grading of reflux as on VCUG

Grade	Urine reflow upto	Dilation/distortion
1	Ureter	Non dilated
2	Renal pelvis	non dilated
3	Renal pelvis	mild dilation +
4	Renal pelvis	moderate dilation + Blunt fornices
5	Renal pelvis	grossly dilated with loss of papillary impression +Tortuous ureter

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is mackie-stephen's theory associating VUR and renal dysplasia?**

A: abnormally originated ureteric bud will interact abnormally with metanephric blastema thus leading to more renal dysmorphism, in short more severe reflux more severe are renal dysplastic changes.

**Q: what is the weigert Meyer rule?**

A: In cases of complete ureteric duplication,

- The upper moiety draining ureter ends in lower/medial ureteric orifice which is obstructive
- The lower moiety draining ureter ends in upper / lateral ureteric orifice which is refluxive, due to shorter intramural length

**Q: what is water hammer renal damage?**

A: this depicts the renal damage from the reflux of "sterile" urine

**Q: which part of kidney is most affected by VUR scarring?**

A: renal poles, that too upper pole more affected than lower pole

Because of the straight in-line alignment of collecting ducts in papilla openings, so that refluxed urine enters in the collecting ducts at its maximum force and alignment.

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## ***Presentation and Work-up***

**Q: what is the RNC grading ?**

A: Radio nucleotide cystography (RNC) grading

Grade 1= Grade 1 (of VCUG) = reflux upto ureter

Low grade =2 = Grade ii & iii (of VCUG) = reflux upto pelvis with minimal dilation

High grade reflux = 3 = grade iv & v (of VCUG) = reflux in pelvis + dilation

**Q: how will you evaluate the pt of suspected reflux?**

A: urine routine, urine culture, RFT, CBC

**Q: How will you collect the urine samples in a child?**

A: if a child can void on command (toilet trained)→ mid stream sample

Otherwise: catheterized samples

Suprapubic aspiration (Best)

Bagged specimen (works)

**Q: what is direct & indirect cystogram?**

A: direct: Bladder is filled directly by catheter

Indirect: Bladder is filled indirectly by IVP

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the other non invasive ways to evaluate VUR?**

A: Radio nucleotide cystogram RNC  
VCUG with colour Doppler

**Q: what is specifically seen in physical examination?**

A: spinal examination / hairy tuft at back / sacral dimple / gluteal folds/ phimosis/palpable bladder/palpable abdominal lump/general growth of child/

**Q: what is passive / active reflux?**

A: Passive reflux: occurs even during Bladder filling /resting  
Active reflux: occurs during voiding

**Q: in a pt with active UTI; when will you do VCUG?**

A: after UTI subsides /atleast one week after or longer

**Q: why do you want a Uroflowmetry in VUR cases?**

A: `to see the flow pattern  
To D/D primary v/s secondary VUR

**Q: what is Top-down approach?**

A:

- after UTI → direct DMSA is done → if DMSA is abnormal then VCUG is done
- Children with negative DMSA, require no further evaluation until they develop recurrent UTI, in which case a VCUG is then done
- Based on Hanson's study 2004
- If VCUG is done primarily → 30% to 40% chances of it being negative

**Q: when will you do cystoscopy?**

A: at the time of operation

- To see for ureteric orifice, duplication , diverticulum etc
- To do STING operation

**Q: what is PIC technique?**

A: positioning instillation of contrast

- Contrast is instilled directly near/ at the U.O. under Cystoscopy & IITV guidance ↓ G/A
- If contrast enters ureter, then reflux is present
- additional 20% cases can be diagnosed

**Q: How will you evaluate upper Tracts?**

A: USG  
DMSA→ sensitivity 98%, specificity- 92%

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what will you see in USG?**

A:

- HN, HUN
- Renal dimension – small kidneys, - irregular outline
- CMD differentiation
- USG with colour doppler for renal vasculature
- Resistive indices on doppler
- Bladder wall thickness ( > 4mm = abnormal thickening)

**Q: what are USG features of renal dysplasia?**

A: small kidney + loss of CMD + increased echogenicity

**Q: At what interval will you do serial USG kidney in watchful waiting?**

A: @ 6 month interval

**Q: what is the basis of doing DMSA?**

A: <sup>99</sup>Tc labeled DMSA is taken up only by functioning tubular tissue, where it binds for several hours

- The uptake of DMSA is proportional to GFR
- Because pyelonephritis impairs tubular uptake of radiotracer, these areas will fail to emit photons and appear as under exposed (cold spots)
- Sensitivity 90%, specificity 92%

**Q: when will you do DMSA scar in a UTI pt?**

A: after 6 months of UTI attack

- Scar formation by 6 months
- All DMSA defects are not scars

**Q: what are Ransley Risdon theories in VUR?**

A:

1. Reflux nephropathy can occur only in infected reflux
2. Ransley Risdon big bang theory ; most of the pyelonephritic scarring occurs in the 1<sup>st</sup> attack

**Q: can primary & secondary reflux co-exist?**

A: yes

**Q: what are the associated conditions with VUR?**

A: from above downwards anatomically

1. Renal anomalies-multicystic dysplastic kidney, - renal agenesis
2. PUJn obstn (1-2%)
3. Ureteric duplication
4. Mega cystic mega ureter
5. Bladder diverticulum
6. Epispadias
7. PUV

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: how are PUJn & VUR related?**

A:

- both are due to ureteric bud abnormality
- 9-18 % of PUJn obstruction have VUR
- 1-3% of VUR pts have PUJn obstn
- Pyeloplasty should be performed first ,
- if pt is suffering primarily with higher abnormality (PUJ) chances of lower abnormal are high (10-20%)
- If pt is suffering primarily with lower abnormality (VUJ) chances of upper abnormal are low (1-2%)

**Q: what are the radiological signs on VCUG to suspect concomitant PUJn obstruction in pts of VUR?**

A:

1. Discrepancy in dilation of ureter & pelvis
2. Pelvis will not fill with contrast but very dilated ureter
3. Contrast that enters pelvis dilutes away
4. Contrast that enters pelvis stays there in pelvis for exceptionally long time

**Q: what is secondary PUJn obstn?**

A: PUJn obstn caused due to VUR

VUR causes kinking of ureter at PUJn

- Chronic stretching of renal pelvis leading to atonicity of PUJn
- Chronic inflammation & fibrosis due to recurrent UTI

**Q: How will you confirm PUJn obstruction with VUR?**

A: nullify reflux by deploying foleys catheter → do MAG3 / EC nuclear scan →  $T_{1/2} > 20$  min => obstruction  
→ do pyeloplasty

**Q: If both PUJn obstruction & VUR is there, what will you operate first?**

A: PUJn pyeloplasty fl/by VUR repair

**Q: why pyeloplasty first rather than VUR correction?**

A:

- If VUR correction is done first than increased resistance at VUJn , so pyeloplasty will not be feasible, hence pyeloplasty first,
- Pyeloplasty can be combined with STING op<sup>n</sup> for VUR

**Q: what is the relation b/w VUR & paraureteric diverticulum?**

A:

- VUR is considered as independent variety in cases of Para ureteric orifice diverticulum
- Treatment of VUR & paraureteric diverticulum should be done independent of each other
- VUR should be operated if U.O opens into diverticulum

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the symptoms of voiding dysfn in children?**

A: Incontinence, Dribbling, Urgency

**Q: what is the relation b/w VUR & renal abnormalities?**

A:

- MCDK & renal agenesis are two most common condition associated with VUR
- Contralateral system has 25% chances of reflux (ipsilateral system is not working in MCDK or agenesis)
- MCDK-reflux corrects with time
- High grade – reflux needs surgical correction

**Q: what is megacystis-mega ureter syndrome?**

A: In pts of VUR, bladder expels urine to exterior as well as up into the ureter. The refluxed urine comes back and fills bladder again. This chronic process leads to gradual but gross dilation of bladder & upper tracts → megacystitis megaureter syndrome

D/D

- Prime belly syndrome
- PUV

**Q: what are the syndromes associated with VUR?**

A:

1. VACTERL
  2. CHARGE
  3. Imperforate anus
  4. Exstrophy
- 
1. Vertebral ,anal, cardiac, Tracheo esophageal renal limb anomalies
  2. Coloboma, heart diseases, atresia choanae, retarded mental, genital hypoplasia, ear abnormal
  3. Imperforate anus

**Q: what is the risk due to VUR in pregnancy?**

A:

- H/O VUR in childhood leads to ↑ chances of pyelonephritis / UTI in pregnancy
- It s generally recommended that all female pts reaching pregnancy age should have their VUR corrected
- Correction of VUR doesnot reduces the morbidity during pregnancy; but it reduces the chances of getting morbidity
- Female with HTN or renal failure are particularly at higher risk

**Q: Is routine cystoscopy done in VUR pts?**

A: no

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the indications for cystoscopy?**

A: suspected ureteric duplication

- Bladder diverticulum
- Suspected ectopic ureter
- During endoscopic Sx

**Q: what are the ind<sup>n</sup> for MCUG in cases of VUR?**

A:

- all children younger than 5 yr with documented UTI
- All children with febrile UTI
- Any male regardless of age / fever/ unless sexually active

**Q: what are the consequences of VUR?**

A:

- `pyelonephritis → pyelonephritis causes scar – small kidney, HTN
- Recurrent UTI
- Renal scarring
- HTN
- Renal failure

**Q: what is the most common presentation with VUR?**

A: LUTS / recurrent UTI

Pain is not a cardinal presenting feature in VUR

**Q: how will you stepwise investigate the patient radiologically?**

A; USG → VCUG → DMSA (nuclear scar)

USG → nuclear scar DMSA → VCUG (Hanson's study)

**Q: when can you do video urodynamics in cases of VUR?**

A: In cases of neurogenic bladder associated with VUR

**Q: How will you screen for VUR in just new born?**

A: USG @ 1 wk      } if both are normal → then VUR is highly unlikely  
USG @ 1 month    }

**Q: what are the indn for VCUG in newborn?**

A:

B/L high grade HN

Ureteric dilation

Ureterocele

Duplex system



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the guidelines for VUR screening in siblings?**

A:

1. The parents should be informed well that siblings & off springs have high chances of VUR
2. Screening is first performed by USG
3. VCUG is done only when USG is abnormal
4. In older children/toilet trained there is no added value for screening for VUR

**Q: What is the recurrence rate after endoscopic management?**

A: 20% @ 2 yrs

Depends upon initial grade of reflux

**Q: what is the most common performed & most reliable operation for VUR?**

A: Cohen's cross trigonal (check this answer, some examiners will like –leadbetter polatino operation)

**Q: If bilateral VUR is there which open surgery approach is better?**

A: Intravesical approach Cohen's

(Extravesical B/L leads to post operative retention of urine)

**Q: what is the indn of cystoscopy before operation?**

A: Before extravesical lich gregoir operation

**Q: what is the bottom line for management of VUR?**

A:

Age 0-1 yr: antibiotic prophylaxis

Age 1-5 yrs – high grade → sx is an option if bilateral VUR, medical management for unilateral VUR

-low grade → endoscopic management

If with LUTS → treat LUTS first

**Q: when can you offer endoscopic management in VUR?**

A: low grade VUR

**Q: in a patient of acute UTI ,when will you do VCUG?**

A:

- UTI leads to ureteric orifice odema and may show false positive or negative VCUG
- VCUG is an invasive procedure
- Start antibiotics
- Do VCUG atleast after 1 wk (preferably 2 wks) allowing infection, inflammation, odema to settle

**Q: when will you do VCUG in acute ongoing UTI?**

A: Only in pts of recurrent UTI; where previous VCUG are normal, then do VCUG this time in acute UTI (but under antibiotics cover)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the present status of RNC?**

A: for screening

For surgical fl/up

**Q: what are the types of PUJ obstruction in pts with VUR?**

A: Holowell grouping

Group 1: primary PUJn obstruction + incidental low grade reflux

Group 2: secondary PUJn obstruction due to primary high grade reflux

Group 3: only dilation of renal pelvis + good drainage of upper tracts

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## ***VUR management***

**Q: what are the general principles of VUR management?**

A: Walker summarized the following general principles of management in children with known vesicoureteral reflux (VUR)

- Spontaneous resolution of VUR is common in young children but is less common as puberty approaches
- Severe reflux is unlikely to spontaneously resolve
- Sterile reflux, in general, does not result in reflux nephropathy
- Long-term antibiotic prophylaxis in children is safe
- Surgery to correct VUR is highly successful in experienced hands
- 

**Q: what are the management options for VUR?**

A:

- observation / wait & watch
- Medical management/ antibiotic prophylaxis
- Surgical management (>95% success rates)
- Endoscopic management

**Q: which VUR cases get spontaneously resolved?**

A:

- grade 1 and grade 2 will resolve spontaneously by 5 yrs of age- 80% chances
- Grade 3 : 50% cases will get resolved
- Higher the grade ; less are the chances of resolving spontaneously

**Q: what is the rationale of medical management?**

A:

- Low dose- prophylactic – antibiotic therapy upto 5 yr of age
- 5 yr is an ample time for low grade VUR to resolve
- After 5 yr of age kidneys become less susceptible to pyelonephritic scarring
- Low dose, single daily, night time dosage. long term antibiotics produce minimal side effects ,

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what antibiotics can you use during watchful waiting period?**

A:

- 0-2 months of age: Trimethoprim/ amoxicillin 5mg/kg/day can be given
- Sulfamethoxazole is not given because of hepatic immaturity and inability to clear sulfamethoxazole.
- 2 months & above = trimethoprim-sulfamethoxazole (TST) (Septran) (1-2 mg/kg/day)  
Nitrofurantion (1-2 mg/kg/day)  
Cephalexin (1-2mg/kg/day) - Ototoxic, -nephrotoxic

**Q: what are the side effects of these medicines?**

A:

- sulfamethoxazole: displaces fetal Bilirubin → leads to jaundice
- Trimethoprim – sulphamethoxazole → jaundice/ kernicterus, GIT disturbances, allergy
- Septran- drug allergy, leucopenia.
- Nitrofurantion: pulmonary fibrosis,
- Niftran syrup - intestinal pneumonia, gi disturbances, peripheral neuropathy  
Bleeding in GCPD deficiency
- Cephalexin - Ototoxic, nephrotoxic

**Q: how will you treat a child of reflux age < 1 yr?**

A: For age < 1 yr

- Any grade reflux/ unilateral / bilateral/ scarred/ unscarred
- Just give antibiotics & wait & watch

**Q: how will you Rx pt of age 1-5 yr VUR?**

A:

- for grade 1,2,3,4- antibiotic prophylaxis-Irrespective of grade/scar/laterality
- For grade -5 : surgery if scarring is present (U/L or B/L)
  - Antibiotic prophylaxis if scarring is absent
- In nut shell: for age 1-5 , surgery is offered only when scarring is present with grade 5
- The classic approach is to offer daily low-dose prophylactic antibiotic suppression of infections as the first line of treatment under the principle that every case of reflux should be offered time to resolve spontaneously, despite grade.

**Q: How will you treat a patient of age 6 -10 yr with VUR?**

A:

Grade 1, 2: medical prophylaxis

Grade 3-4 – unilateral/bilateral - antibiotic prophylaxis if asymptomatic

-Bilateral VUR - Surgery if symptomatic /scarring

Grade 5 – Surgery even if unilateral, irrespective of scarring

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the dis adv of antibiotic prophylaxis?**

A:

- Long term
- Non economical
- Patient /child poor compliance
- Chance of repeated / break through infection
- Added childhood infection / viral fever / URTI
- Side effects of medicines

**Q: what is drug holiday?**

A: when all medicines (prophylactic antibiotics) are stopped. And the pts is actively watched & fl/up

**Q: what are the indications for surgery as primary treatment modality in VUR patients?**

A:

- age < 1 yr :-- no indn
- age 1-5 yr : proven renal damage (scarring) with grade 5 reflux
- age 6-10 yr : Bilateral grade 4 reflux or unilateral grade 5 reflux

---

## **Endoscopic Management Of VUR**

**Q: who described the STING procedure?**

A: It was O'Donnell and Puri (1986) who popularized the technique

- They coined the term STING (Subureteric Teflon Injection)
- The ability to correct reflux in a large proportion of patients (the more recent studies report success
- rates approaching 90% after one injection of Deflux in low grade primary reflux on an outpatient basis
- using a simple procedure with minimal morbidity
- The classic STING technique was described by O'Donnell and Puri (1984).

**Q: describe the procedure of STING?**

A:

- Prophylactic antibiotic is usually administered with induction of anesthesia.
- A cystoscopy should be carried out before opening the materials in case the procedure is cancelled due to inflammatory changes in the bladder.
- If a rigid needle is used, an offset lens injection scope should be used. If a flexible needle is used, a standard 0- or 30-degree lens cystoscope can be used.
- The size of the needle varies depending of the viscosity of the material and ranges from 3.7 Fr to 5 Fr.
- The viscosity of the material also determines whether injecting the material can be carried out using a regular syringe or requires a ratcheted metal syringe holder.

## **Neeraj Sharma's ...Notes For Urology Practicals**

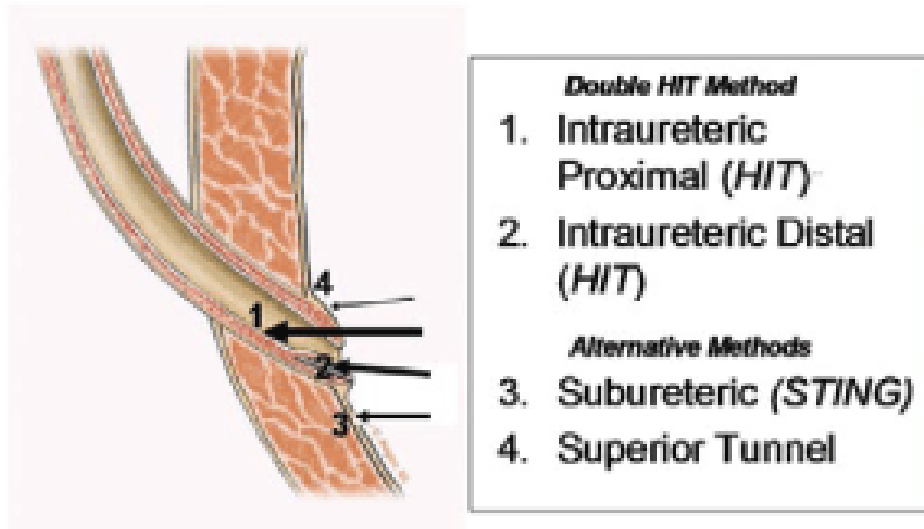
- A 3-Fr ureteric catheter may be introduced to lift up the anterior wall of the ureter and identify the axis of the tunnel. The needle is inserted with the bevel facing up at the 6 o'clock position.
- The original description by O'Donnell and Puri suggested entering the mucosa 2 to 3 mm distal to the uretero vesical junction and advancing the needle in the submucosal plane for a distance of 4 to 5 mm.
- Injection should be carried out slowly. If the needle is positioned in the submucosal plane, the mound becomes apparent with the initial injection of 0.1 to 0.2 mL
- Once a volcano appearance with the ureteral meatus on top of the mound is achieved, additional volume is injected until the ureteral orifice becomes crescent or slit shaped.
- For most materials, the needle should be kept in place for 1 minute at the end of the injection to reduce extrusion of the material at the injection site. With Deflux this step is not essential.
- The bladder is emptied, and the mound is inspected with an empty and a full bladder to ensure that adequate support of the ureter is persistent.
- At the end of the procedure lidocaine gel may be instilled in the urethra; catheter drainage is not necessary. In general the child spends a brief amount of time in the recovery room followed by discharge. All activities can be resumed immediately.

**Q: what is HIT and what is double HIT? How do they differ from STING?**

**A: Hydro-distention implantation technique (HIT)**

- When single injection is made just into the bed of ureteric tunnel (proximal to VUJn) it is called single HIT .usually done for low grade reflux.
- When one injection is additionally injected into the bed of the ureteric tunnel in more proximal position, it is called double HIT. double HIT is used for high grade reflux
- In STING the injection is made just below the lower lip of VUJn in sub ureteric position
- In 2004, Kirsch described a modification called the hydrodistention implantation technique (HIT) . The needle is advanced into the ureteral tunnel and Dx/Ha is injected along the entire length of the detrusor tunnel for maximal coaptation.
- A total of 89% of patients undergoing HIT had resolution of reflux versus 79% undergoing standard STING .
- HIT was further modified to include two intraureteral injections (proximal and distal), for total ureteral tunnel coaptation. The goals of "double HIT" are to create a "mountain range appearance" of the ureteral tunnel and eliminate hydrodistention.
- Success rates ranged from 70 to 95%.

## Needle Placement Algorithm



Q: how will you decide that where to inject and how many injections are needed?

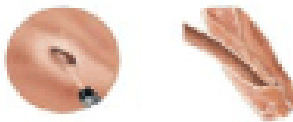
A: according to hydro distention grading of VUJn on cystoscopy

## Dynamic Hydrodistention Classification

H0 UO does not open



H1 UO opens slightly, cannot see into tunnel



H2 Can see into tunnel, not extravascular ureter



H3 Can see up extravascular ureter, ureteroscopy



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what are the complications of STING?**

A: Bleeding, LUTS and transient urinary retention

Rarely, bleeding occurs at the puncture site. This is best dealt with by emptying the bladder and applying gentle pressure with the tip of the scope until the bleeding stops.

Cauterizing the area is not advisable because it results in sloughing of the mucosa and extrusion of the injected material.

### **Q: how will you follow-up a child of STING?**

A: The child is maintained on antibiotics for 3 months when a follow-up ultrasound and VCUG are obtained.

- If reflux resolves ,continue antibiotics for another 3 months and then stop, followed by 6 monthly USG and one VCUG after 12 months
- If reflux is persistent, a repeat injection can be considered 6 months after the initial injection.
- If there is still no resolution, then open surgery is recommended.

### **Q: what are the agents used for Endoscopic Correction of Vesicoureteral Reflux?**

A:

#### **Nonautologous Materials**

- Poly tetra fluoro ethylene (PTFE)
- Cross-linked bovine collagen
- Poly dimethyl siloxane
- Dextranomer hyaluronic copolymer (Deflux)
- Coaptite

#### **Autologous Materials**

- Chondrocytes
- Fat
- Collagen
- Muscle

### **Q: what are the major disadvantage /concern with STING?**

A: The concern with the particulate agents is **migration** and with degradable agents is **durability**.

### **Q: what are the advantages of injection therapy?**

A: one-day OPD base treatment

Either complete resolution of reflux or at least partial resolution of reflux

Prevents water hammer damage

**Q: how does distant migration occurs?**

A: distant migration can occur by two mechanisms.

- The first is expansion of the injected bolus, which may lead to disruption of the small vessels in the area of the distal ureter and trigone, resulting in the material gaining intravascular access. Particles smaller than 50 µm may bypass the pulmonary vascular bed and thus access the systemic circulation and reach other organs in the body.
- The second migration mechanism is by phagocytosis of the injected particles by tissue macrophages or blood-borne monocytes. The particle size determines whether phagocytosis can occur, as it is generally agreed that phagocytosis requires a particle less than 80 µm in diameter.

**Q: what is Deflux?**

A: Dextranomer/Hyaluronic Copolymer (Deflux)

Dextranomer/Hyaluronic Copolymer (DX/HA) is formed of cross linked dextranomer microspheres (80 to 250 µm in diameter) suspended in a carrier gel of stabilized sodium hyaluronate. DX/HA is biodegradable, the carrier gel is reabsorbed, and the dextranomer microspheres capsulated by fibroblast migration and collagen ingrowth. DX/HA loses about 23% of its volume beyond 3 months of follow-up .

**Q: is Deflux available in India?**

A: Dr Reddy's Laboratories Ltd has entered into an agreement with the US-based Oceana Therapeutics to sell and distribute its drug Deflux in India .Deflux India cost is 33000 rupees. Needle size is 3.7 fch.

**Q: what is the latest trial on antibiotic prophylaxis?**

A: In 2014, the results of the Randomized Intervention for children with Vesicoureteral Reflux (RIVUR) study were published. This large 2-year randomized, controlled trial showed that antibiotic prophylaxis with trimethoprim-sulfamethoxazole was associated with a decrease of approximately 50% in the incidence of recurrent UTI among children with VUR, in comparison with placebo.

No difference in renal scarring was observed between groups. There was a significant increase in the frequency of resistant organisms in children on treatment in comparison with placebo.

**Q: what are the indications for surgery?**

A: Accepted indications for surgical treatment include the following:

- (1) Breakthrough febrile UTIs despite adequate antibiotic prophylaxis;
- (2) Severe reflux (grade V or bilateral grade IV) that is unlikely to spontaneously resolve, especially if renal scarring is present;
- (3) Mild or moderate reflux in females that persists as the patient approaches puberty, despite several years of observation;
- (4) Poor compliance with medications or surveillance programs; and
- (5) Poor renal growth or function or appearance of new scars.



**Q: what are the various operations for VUR correction?**

**A:**

**Extravesical**

**Lich-Gregoir** : The juxtavesical ureter is dissected and a submucosal groove is created extending laterally from the ureteral hiatus along the course of the ureter. The ureter is placed in the groove and the detrusor is closed over the ureter.

Advantages: This technique does not require bladder opening or ureteral stent placement.

Disadvantages: There is an increased risk for pelvic nerve damage and urinary retention, especially for bilateral procedures, and is not performed within the first year of life.

**Intravesical**

**Politano-Leadbetter**: The ureter is mobilized intravesically and then brought through a new muscular hiatus located superior and lateral to the original mucosal orifice .

Advantages: This technique enables creation of a longer tunnel, which is useful in higher grades of reflux.

Disadvantages: In addition to postoperative hematuria, patients are at risk for ureteral kinking/obstruction and bowel injury.

**Glenn-Anderson**: The ureter is advanced distally through a submucosal tunnel extending inferomedially towards the bladder neck. A later modification with proximal incision of the detrusor at the original hiatus enabled creation of a longer tunnel.

Advantages: There is a reduced risk for ureteral kinking/obstruction with this technique.

Disadvantages: The distal ureteral anastomosis may be challenging due to proximity to the bladder neck.

**Cohen** : The ureter is advanced through a submucosal tunnel across the trigone to the contralateral bladder wall with the new mucosal orifice located superior to the contralateral orifice .

Advantages: This technique enables creation of a longer tunnel length and avoids ureteral kinking.

Disadvantages: Retrograde catheterization is difficult following repair.

**Summary points**

- Children with VUR are more likely to develop acute pyelonephritis and renal scarring compared to children without VUR.
- Surgical correction of VUR reduces the occurrence of febrile UTIs.
- The 2010 AUA guidelines recommend consideration of surgical (open or endoscopic) correction of VUR in patients receiving continuous antibiotic prophylaxis with a febrile breakthrough UTI.
- Pre-operative reflux grade is the single most important factor affecting the success rate of endoscopic injection.
- Patients with febrile UTI following treatment with endoscopic injection should be evaluated with VCUG to rule out recurrent VUR.





***Neeraj Sharma's-  
NOTES FOR UROLOGY PRACTICALS***

***Wilm's Tumor***

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**Wilm's Tumor**

Case 1

A 2.5 yr old female child is brought to the hospital by parents with complaints of abdominal swelling since 15 days

ODP

Pt was relatively asymptomatic below 15 days when the mother incidentally noticed the Rt sided abd, swelling of a cricket ball size during bathing the child. The swelling is of same size since that day, neither increased nor decreased in size, not related to any relieving or aggressive factors

Child is eating well, playful

No H/O trauma, No H/O hematuria

No H/O any bowel / bladder disturbances/ N/V/D

No H/O fever / recent illness

No H/O visual impairment / Genitourinary abnormal @ birth/ mental retardation

No H/O speech impairment / limb abnormal growth fainting episodes

Past medical H/O

Past Sx H/O

} NAD

Past immunization history; upto date

Birth H/O: cesarean delivery @ 34 weeks 2.0 kg birth wt

Immediate cry, Nil-otherwise

Family H/O - NAD

-father, mother, sibling H/O →NAD

On examination

Child is well playful, oriented moderately built, moderately nourished

T- Normal,

p- 102/min

BP- 104/ 60

Eyed normal, Tongue normal

All limbs – normal

Spinal examination→ normal

No limb edema,

RS /CVS- clear

Abd examination

On examination inspection

- Abdomen is flat, skin is normal
- Umbilicus is centrally located, inverted

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Mild fullness seen in Rt upper Quadrant

On palpation

T- Normal, no tenderness

A firm slightly mobile 10-12 cm mass is felt in Rt upper qdt

Ballottement	}	negative
Fluctuation		
Transillumination		

On knee elbow position-mass doesnot fall away (retroperitoneal)

**Q: what all it could be?**

A:

- Right Renal mass – Wilms tumours
- Retroperitoneal mass
  - neuroblastoma
  - Rhabdomyosarcoma
- Right polycystic kidney
- Right gross HN
- Multiloculated renal cyst
- RCC

**Q: how will you investigate the child?**

A:

- Basic blood & urine Ix
- X-ray → CXR, KUB
- USG abd (in case of hard renal lump direct CT scan be done)

**Q: what is the other name of Wilms tumour?**

A: Nephroblastoma

**Q: from which cells & when it starts developing?**

- Develops in intrauterine life
- From primitive Metanephric Blastoma

**Q: what is the Incidence of Wilm's tumour?**

A: 5-10 % of all childhood tumours

10% are Bilateral

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the Basic etiology of Wilm's tumour?**

A: WT<sub>1</sub> gene on 11p13

- Beta catenin pathway
- Intralobular Nephrogenic Rests
- Associated with  
WAGR  
Denys Drash syndrome  
Frasier syndrome

WT<sub>2</sub>, gene – 11p15

- IGF-2 & loss of imprint pathway  
↓  
EFG  
↓  
Beckwith Wiedemann syndrome

**Q: what are the common congenital abnormalities associated with Wilm's?**

A:

- Cryptorchidism (part of WAGR)
- Double renal collecting system
- Horse shoe kidney
- Hypospadias (part of WAGR) (SWOHWWD)

**Q: what are the common syndromes a/w Wilm's tumour?**

A:

1. **WAGR** (WT<sub>1</sub> gene on 11p13)
  - Wilms tumour (50%)
  - Aniridia
  - G.U abnormal
  - Retardation mental
2. **Denys Drash syndrome (DDS) WT1**
  - Wilm's tumour
  - Gonadal Dysgenesis (pseudo-hermaphrodite)
  - Nephropathy (mesangial sclerosis) Later ESRD
3. **FRASIER syndrome**
  - Wilm's tumour (rare 5%)
  - Gonadoblastoma (50%)
  - Gonadal dysgenesis (male pseudo hermaphrodite, genetic XY, Phenotype-female)

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Nephropathy (focal segmental glomerulosclerosis)



Appear late in comparison to DDS

### **4. Beckwith Weidman syndrome (BWS), WT<sub>2</sub> gene – 11p15**

- WT<sub>2</sub> – Wilm's tumour (5%)
- Hemi hypertrophy
- Macroglossia
- Macrosomia (↑ birth wt & ↑ length, nephromegally, Hepatomegaly)
- Umbilical defects
- Neonatal Hypoglycemia

### **Q: What is the importance of WT<sub>1</sub>- gene?**

A: encodes Zinc finger Transcription factors

WT1 required for- ureteric bud formation

- nephrogenesis
- gonadal formation

### **Q: what is Imp of WT<sub>2</sub>?**

A:- WT<sub>2</sub> → (produces)IGF-2→(controls)Epidermal growth factor EGF

Uncontrolled EGF leads to Macrosomia

↑ Metabolic demand by tissues lead to neonatal hypoglycemia

### **Q: what important chromosomal abnormality will you look for?**

A: LOH (loss of Heterozygosity) on 1p & 16q

(Poor prognostic factors)

### **Q: what are the presentations of a patient of Wilm's tumour?**

A:

- Abd mass
- Abd pain
- Hematuria
- Fever, UTI
- HTN
- Metastatic symptoms
  - Lung – cough, Respiratory distress
  - IVC compression – limb edema, ascitis, varicocele, HTN, CHF



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what will you specially ask for in the history of a patient of Wilm's tumour?**

A: I will ask for history of

Visual disturbance  
Speech disturbance  
Mental growth

} WAGR

Speech disturbance-Macroglossia  
Hypertrophied organs  
Urine protein DDS  
H/O fits

} BWS

Birth H/O

Immunization H/O

Family H/O

**Q: what % of Wilms patients will have HTN?**

A: 2%

**Q: What is the cause of HTN in Wilms?**

A:

1. Bioactive substances from tumour (para-neoplastic syndrome)
  2. Compression of renal vessel (RVH) / segmental artery
- HTN should resolve after Nephrectomy

**Q: what are the indications for emergency operation in a patient of Wilm's tumour?**

A: active bleedings

Tumour ruptures

**Q: What will you esp see for in lab lx in a patient of Wilm's tumour?**

A: Hb, serum creatinine, Sr  $Ca^{++}$ , coagulation profile, platelet count

**Q: why coagulation profile?**

A: factors VIII deficiency

Von willibrand disease (in 10%)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what radiological investigations will you like to do in a child with suspected renal HARD mass ?**

A: ideally there is no need for x-ray or USG and straight forward CECT can be done

CT abdomen with contrast

- Mass size,
- Organ of origin
- Contralateral kidney
- IVC involvement/thrombus
- enhancement of mass
- L.N status
- liver mets

CXR-PA/ CT-Chest → chest mets

**Q: what will you do next?**

A: As there is no family H/O ,

No syndromic association

Normal contralateral kidney

I will counsel the parents for Rad Nephrectomy

**Q: will you do Biopsy of the lesion?**

A: No

- Because chances of Tumour seedling / rupture/ hemorrhage/ stage change
- More over false –ve rates of biopsy are high
- Management plan does not alter

**Q: what incision will you choose for Wilms tumour nephrectomy?**

A: Transverse incision, 2 finger breadth above the umbilicus, from mid axillary line (on the side of tumour) to 1 cm beyond midline

↓

Transperitoneal, trans-abd approach

↓

Evaluation liver, peritoneal cavity

↓

Reflect colon medially

↓

Complete Nephrectomy

↓

Send for biopsy

↓

Close

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what will you next?**

A: staging of tumour (children's oncology Group)

Stage – 1: Tumour confined to kidney, completely removed

2. Extra capsular penetration, completely removed
3. Peritoneal spill, margin +ve Residual disease, L.N involvement
4. Distant mets to lung, liver, bone, brain
5. B/L renal tumour

NWTS-staging

---

### Stage I

- Tumor confined to kidney without capsular or vascular invasion, tumor was not biopsied or ruptured. No residual tumor tissue after resection

### Stage II

- Tumor beyond renal capsule, vessel infiltration, biopsy performed before resection or intraoperative tumor rupture. Confined to the flank, not involving peritoneal surface

(Completely resectable tumor with tumor-free margins)

### Stage III

- Positive lymph nodes in abdomen or pelvis, peritoneal invasion, tumor-infiltrating cuff of urinary bladder or residual tumour at surgical margins

### Stage IV

- Hematogenous metastases (lung, liver, bone or brain) or lymph node metastases outside the abdomino–pelvic region

### Stage V

- Bilateral renal involvement present at diagnosis
- 

**Q: what are the Indications for pre OP chemo Rx?**

A:

- Bilateral tumour
- Solitary kidney
- Planning NSSx(nephron sparing surgery)
- IVC involvement above hepatic veins
- Unresectable tumour
- Tumour in horse shoe kidney

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the most imp prognostic factors?**

A:

1. Histology / anaplasia/ degree of undifferentiation
2. LOH of chr 1p & 16q

Other factors

Tumour size, mets, LVI

Cytogenetic factors (poor)

- ↑ Telomerase activity
- DNA index > 1.5
- LOH 1p 16q

**Q: How will you do risk stratification in Wilms?**

A: Shamberger criteria (for local recurrence)

- ➔ Histology – favorable, - unfavorable
- ➔ Tumour spill
- ➔ Residual tumour
- ➔ Lymph node involvement

**Q: what management protocol do you follow?**

A: NWTSG → surgery first then chemo

**Q: what is the difference between NWTSG and SIOP treatments in Wilms tumour?**

A:

- NWTSG which follows the upfront surgery principle in all stages of the disease.
- The SIOP which follows the upfront chemotherapy principle in all stages of the disease.
- The NWTSG has always recommended upfront nephrectomy to define the accurate stage of the tumor and the histology, on which further treatment stratification is decided.
- In contrast, the SIOP investigators pioneered the concept of pre-nephrectomy chemotherapy in all patients over 6 months of age to reduce the tumor size and prevent intraoperative spillage due to tumor rupture and increased the proportion of children with a lower tumor stage that required less overall treatment

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is NWTs?**

A:

- Three co-operative groups, the children's cancer study group (CCSG), the cancer and leukemia group B (CALGB), and the southwest Oncology Group (SWOG) combined to form an intergroup known as National Wilms Tumor Study (NWTs) in 1969 as there was a need to collaborate in gathering a statistically significant number of patients.
- The NWTs, a cancer research co-operative group, was created with the purpose of improving survival of children with Wilms' tumor.
- Many pediatric oncology centers (over 250) in the United States, Canada and other countries joined this study group

### **Q: what is COG?**

A:

- In 2001, NWTs merged with several other pediatric oncology cooperative groups to create the Children's Oncology Group (COG).
- However, the NWTs is still active in name today completing follow-up of the late effects of treatment for patients previously enrolled in its trials

### **Q: what are the trials conducted by NWTSG?**

A: Purpose of study

- NWTs 1 – To determine the effect of surgical technique on the results of the treatment.
- NWTs 2 – To study the prognosis of patients with Wilms' tumor.
- NWTs 3 – To reduce the treatment for low-risk patients and find better chemotherapy for those at high risk for relapse.
- NWTs 4 – To evaluate the efficacy, toxicity and cost of administration of different regimens for the treatment of Wilms' tumor.
- NWTs 5 – To identify the biologic prognostic factors.

### **Q: what is SIOP?**

A:

- SIOP (Societe Internationale D'oncologie Pediatrique) is another European Group that in 1971 started studies on Wilms' tumor.
- It differed from NWTs in the concept of giving preoperative chemotherapy to all patients.
- The promoters of SIOP with a view of reducing the risk of tumor rupture during upfront surgery, as was seen during NWTs studies, planned upfront therapy – initially radiotherapy and later chemotherapy to shrink the tumor

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the SIOP trials?**

**A: SIOP 1**

Pre-operative radiotherapy significantly prevents tumor rupture and induces favorable stage distribution.

Additional actinomycin-D (6x) does not improve DFS/AS in either arm.

**SIOP 2**

The benefits of pre-operative radiotherapy as in SIOP 1 trial were confirmed.

Post-operative chemotherapy for 6 months as good as 15 months. Hence, children should receive chemotherapy only for 6 months following nephrectomy.

**SIOP 5**

Pre-operative 2 drug chemotherapy is as effective as pre-operative radiotherapy in avoiding ruptures and improving the stage distribution.

**SIOP 6**

Stage I – Treatment with Vincristine and Dactinomycin was as effective for 17 weeks as for 38 weeks in terms of event-free and overall survival rates.

Stage II – Patients with negative lymph nodes who were assigned to receive no radiation therapy had a higher recurrence rate.

**SIOP 9**

Stages I, II, III – 8 weeks pre-operative treatment does not produce a favorable stage distribution compared to 4 weeks.

**Q: what is the SIOP histological classification?**

**A:** SIOP histologic classification is as follows:

- a. Low risk (completely necrotic nephroblastoma or cystic partially differentiated nephroblastoma),
- b. Intermediate risk (regressive, epithelial, stromal, mixed, or focal anaplastic nephroblastoma), and
- c. High risk (blastemal or diffuse anaplastic nephroblastoma).

**Q: what are the advantages and disadvantages of NWTSG?**

**A:** NWTSG investigators recommend immediate nephrectomy because pre-nephrectomy chemotherapy administration is associated with several risks, including the following:

1. administration of chemotherapy to a patient with a benign disease as in SIOP trials, pre-chemotherapy confirmation of diagnosis is not mandatory;
2. administration of chemotherapy to a patient with a different histological type of malignant tumor;
3. modification of tumor histology; and
4. Loss of staging information.

Disadvantages

- Tumor spillage intra-operatively, which increases the risk of local abdominal relapse and subsequent poor outcome
- Failure to sample lymph nodes leads to downstaging and under-treatment of the patient

**Q: what are the advantages and disadvantages of SIOP?**

A:

- It reduces the tumor size considerably, thereby making surgery simpler and reducing the chances of tumor rupture intra-operatively; this reduces the likelihood of local and distant recurrence
- Possible role of renal sparing surgery in the affected kidney could be evaluated with the tumor size reduced pre-operatively

Disadvantages

- Pre-nephrectomy chemotherapy is considered to cause alterations in tumor histology and to downstage the tumor
- Chances are there that the tumour in question may not be a Wilms tumour at all , the child then gets a chemotherapy unnecessarily.

**Q: what are the factors or local recurrence?**

A: Shamberger criteria

- tumour spillage
- Unfavorable histology
- Incomplete removal
- LVI+
- LN+

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you treat a Wilms tumour according to NWTs protocols?**

	<b><i>Base step</i></b>	<b><i>favorable histology</i></b>	<b><i>Focal anaplasia</i></b>	<b><i>Diffuse anaplasia</i></b>
<b><u>Stage- 1</u></b>	Partial or complete Nx	VA x 18 wks	VAD x 18 wks	VAD x 18 wks
<b><u>Stage- 2</u></b>	Complete Nx	VA x 18 wks	VA x18 wks	VAD x 18 wks +/- CE
<b><u>Stage- 3</u></b>	Rad Nx + local XBRT	VAD x 18 wks	VAD x 18 wks	VAD +CE x 18 wks
<b><u>Stage- 4</u></b>	Neoadj. Chemo 6wk +Surgery +adj. XBRT	VAD x 18wks	VADx18wks	VAD +CE x 18 wks
<b><u>Stage- 5</u></b>	Neo adj → Biopsy→repeat neo adj chemo 6 wk→B/L NSSx +XBRT adjuvant	VADCE x 18	VADCE x 18	VADCE x 18

**Q: what are chemo related complications in childhood?**

A:

- GIT abnormalities
- Pancytopenia, anaemia
- Bone marrow depression
- CHF

**Q: what are complications of XBRT in childhood?**

A:

- Scoliosis
- Short height
- Hypogonadism
- Testicular / ovarian failure
- Pregnancy related (miscarriage)
- Secondary malignancies
- GIT, GUT toxicities



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: After whom is Wilms tumour named as?**

A: 'Max Wilms' German surgeon

**Q: What are the etiological types?**

A:

- sporadic -90%
- Familial -2%
- Syndrome- 8%

**Q: what are the syndromes associated?**

A:

WAGR	WT, Aniridia, G.U abnormalities, retardation mental
DDS	Denys Drash syndrome- WT, pseudo-hermaphrodite, nephropathy ,
Frasier's	WT, Pseudo-hermaphrodite, FSGS (nephropathy)
BWS	Beckwith–Wiedemann syndrome– Macroglossia gigantism umbilical hernia, hypoglycemia

**Q: what is sex ratio incidence?**

A; M/ F = 1:1

**Q: what is the most common site of mets?**

A: lungs

**Q: what is the histological pattern in Wilms tumour?**

A: Tri phasic

- Epithelial
- Blastemal
- Stromal

**Q: what are CPDN, CN, and CWT?**

A: CN

→

CPDM

→

CWT

Cystic Nephroma  
(Benign)

cystic partially differentiated  
Nephroblastoma

cystic Wilms tumour



Observation



Rad Nx is complete cure



Rad Nx + chemo

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Will you do lymphnode dissection with nephrectomy?**

A:

- No, RPLND not required
- Only enlarged LN removed
- Sampling may be done for staging purposes

**Q: Is Biopsy Indicated?**

A: - NO

- According to NSGCT protocol, in stage -V Bilateral disease, Biopsy can be performed.

**Q: what will you do for large / unresectable Wilms tumour?**

A: chemo first (Neo-adj) x 6 cycles

**Q: When will you do surgery after neo adjuvant chemotherapy?**

A: after completion of initial course of chemotherapy, usually at 8-10 wks

**Q: what are the chemo agents?**

A:

- Vincristine = Oncovin
- Adriamycin = doxorubicin
- Dactinomycin = actinomycin

**Q: what will you do for pt < 6 month age?**

A: Surgery 1<sup>st</sup>

FI/by Vincristine + Adriamycin (If needed)

Reduce dose of Dactinomycin to 1/3 (If needed)

**Q: What protocol is followed in India?**

A: NWTSG

**Q: What is prognosis?**

A: >80%, 5yr survival after multimodality Rx

**Q: Suppose the HP-examination report of Nephrectomy comes as clear cell sarcoma?**

A:

- Sarcoma arises from mesenchymal cells
- Mesenchymal tumour with cells depicting clear cytoplasm
- Highly aggressive tumour
- Requires post op radiotherapy (even on stage 1)
- Blood / Hematogenous metastasis common

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Bone / Brain mets are common
- Do bone scan MRI brain
- Give post op doxorubicin , Vincristine, Cyclophosphamide, VADCE

### **Q: What If the biopsy comes as Rhabdoid tumour of kidney (RTK)?**

A:

- Variant of sarcoma → arising from muscle cells Rhabdomyosarcoma
- Very aggressive / very lethal – sarcoma
- 2%
- Early presentation / advanced stage
- RTK mets to Brain → Do CT/MRI Brain
- Chemo Resistance
- Give IMRT to brain & XBRT to tumour bed

### **Q: what If the biopsy comes as congenital mesoblastic nephroma (CMN)?**

A: CMN is the most common tumour

- Mean age of presentation 3.5 months
- Histological type- classic, -cellular- mixed
- Rad Nx is enough (complete removal)
- No need of post op chemo / radio

### **Q: What is CPDN?**

A:

- Cystic Partially differentiated Nephroblastoma
- Occurs within 2 yrs of life
- Contains Blastemal cells / Nephrogenic rests
- Rad Nx is complete cure
- Post op chemo If nodes are involved

### **Q: What if Biopsy is Angio myolipoma?**

A: Usually diagnosed at CECT

- Rare in childhood
- Associated with T.S.C (tuberculosis sclerosis complex)
- Often bilateral, multiple, evolving lesions
- Renal lesions in TSC are – simple cyst
  - AML
  - Polycystic kidney disease
  - RCC
- Tendency to bleed
- Mx – angio embolization, - partial Nx
- Cut off size for surgery is 4 cm

**Q: What can be the D/Ds for suspected Wilms Tumours?**

**A:**

1. Wilm's
2. Neuroblastoma
3. RCC
4. Clear cell sarcoma
5. Cystic nephroma (Benign)
6. Partially differentiated cystic willing
7. Multi loculated cyst (benign)
8. AML (Benign)
9. MCDK (Benin)

**Q: what is the role of FDG-PET in the diagnosis and staging of Wilms tumour?**

**A:** no role



***Neeraj Sharma's-***  
**NOTES FOR UROLOGY PRACTICALS**

***Urethral stricture disease***

Chapter editor...

Dr Shivshankar  
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## **Neeraj Sharma's ...Notes For Urology Practicals**

### Urethral Stricture disease (USD) Anterior Urethra

#### **Q: What does urethral stricture disease implies to?**

A: Urethral stricture disease refer to ANTERIOR urethral disease / scarring involving corpus spongiosum

#### **Q: what does posterior urethral stricture known as?**

A: Post urethral stenosis / Contracture

By definition urethral stricture = Anterior urethral stricture

Distraction defects = membranous urethra

#### **Q: what are the causes of U.S.D?**

A: M/C = trauma

1. Straddle Trauma (late presentation)
2. Iatrogenic Trauma (due to Instrumentation) like post TURP
3. Inflammatory:
  - Gonorrhea
  - Ureaplasma
  - Chlamydia
4. BXO – Borrelia burgdorferi

#### **Q: what is the M/C site of USD?**

A:

1. Bulbar stricture due to Trauma or Inflammation
2. Meatal stenosis (instrumentation / catheter/ BXO)
3. Pan urethral (catheter)

#### **Q: What are the common presentation modes of USD?**

A:

- BOO, Obstructive LUTS
- Prostatitis
- Epididymitis
- Urinary retention
- Hematuria (rare)

#### **Q: what are the grades of anterior urethral injury?**

A;

Grade 1: Contusion

Grade 2: Partial Tear

Grade 3: Complete tear

} Mc' annich classification

## Neeraj Sharma's ...Notes For Urology Practicals

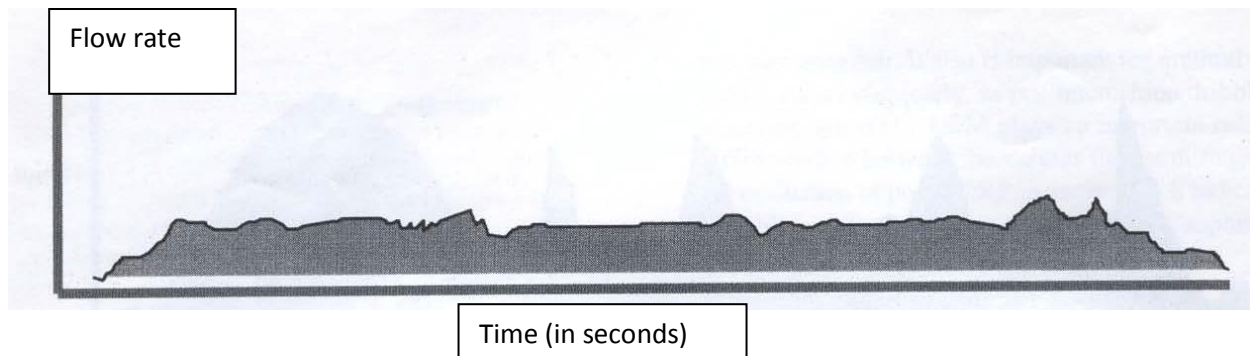
**Q: what are the basic investigations for urethral stricture disease?**

A:

- Uroflowmetry
- Ascending urethrogram (AUG)

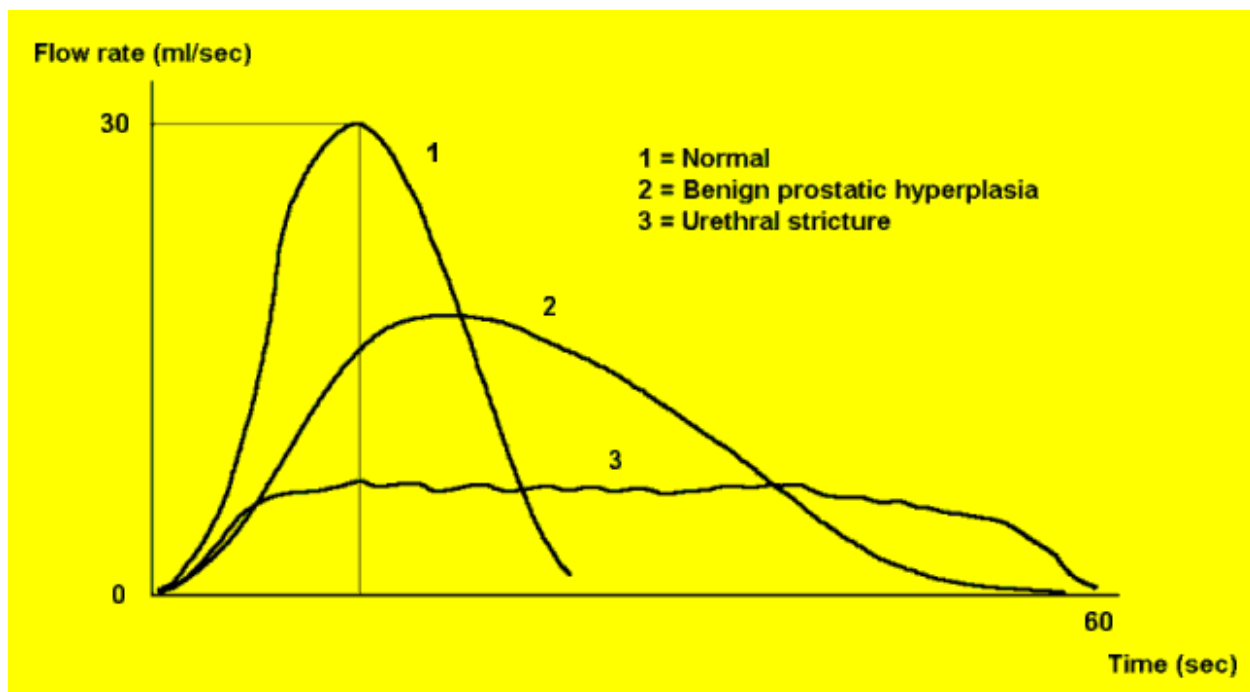
**Q: what is the typical pattern of uroflow in a patient of urethral stricture disease?**

A: box type pattern or plateau pattern



**Q: how will you distinguish the uroflow curve of stricture v/s prostatomegaly?**

A: Normal curve is a sharp peak bell shaped curve. Uroflow of stricture disease is a flat curve where as uroflow of prostatomegaly is a low peak broad – bell shaped curve.





## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: how will you confirm your findings of a plateau shape curve on uroflow?**

A: I will do a ascending urethrogram (AUG)

---

**AUG**

**Q: What contrast agents do you use for AUG?**

- Diatrizoate meglumine
- Iothalamate meglumine
- 20 ml of 60% dilution Is needed

**Q: what is urograffin?**

A: Amidotrizoate meglumine+ amidotrizoate sodium

**Q: What is the m/c contrast media?**

A: **ME**glumine **DI**Atrizoate – media

Commercial names: hypaque, Gastrograffin

**Q: what are Amidotrizoates?**

A: Amidotrizoate  
Monomeric  
Iodinated compound

} Contrast media

Amidotrizoate are unstable per se and thus they are stabilized by mixing them with meglumine or sodium salts

**Q: what is Meglumine?**

A: Meglumine = Meglu – amine

It is an amino sugar which combines with amidotrizoate and thus makes a stable compound meglumine-Amidotrizoate

**Q: what is Hypaque/Urograffin / Gastrograffin?**

A: Hypaque  
Gastrograffin  
Urograffin = Meglumine amidotrizoate + Diatrizoate sodium

} → meglumine Diatrizoate

**Q: what is the difference b/w amidotrizoate & diatrizoate?**

A: Both are same thing

**Q: What is the length of male urethra?**

A: 18-22 cm (mean 20 cm)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is Verumontanum?**

A: Verumontanum is the Urethral crest.

Prostatic utricle is the vestigial remnant of müllerian ducts and represents “uterus” equivalent.

**Q: what is the Length of membranous urethra?**

A: 1 cm

**Q: What is Double contrast air urethrogram?**

A: when the air is injected after contrast, same like double contrast barium enema.

**Q: what other structures can be seen on AUG?**

A:

- Littre's glands
- Cowper's glands
- Vas
- Seminal vesicles
- Prostatic Ducts

**Q: where & when will you find Cowper's glands & ducts?**

A: Glands are located posterolateral to membranous urethra and their Ducts insert into floor of bulbar urethra.

Littre's glands are in bulbar ant. Urethra.

**Q: Describe the pt position for AUG?**

A: supine with 45° oblique, 90° lower hip flexion, upper leg straight

- Lower arm folded under head ,upper arm holding straight across body

**Q: what are the different clamps / catheters for AUG?**

A: Best Foleys 10 F / 12 F with 1 -2 ml balloon inflation in fossa navicularis.

(DO NOT USE JELLY, otherwise balloon will slip out)

Knudson's penile clamp

Brodney's penile clamp

**Q: what is auto urethrogram?**

A When pt. himself injects contrast in urethra

**Q: what is the catheter used in female?**

A: Tratner's double balloon catheter

**Q: how do you estimate bladder capacity?**

A: Koff's formula

Bladder Capacity = (age (in yrs) + 2) x 30 ml

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is choke Cysto-uretherography?**

A: During voiding phase the pt abruptly closes off the meatus by pinching glans tip thus leads to high pressure uretherography → choke Cysto-uretherography.

### **Q: what are the complications of VCUG/ AUG?**

- Inf<sup>n</sup>,
- trauma ,
- Extravasations,
- Contrast R<sup>n</sup>,
- Inadvertent catheterization of vagina(in female child)
- bladder perforation
- Knotting of urethral catheter inside bladder

### **Q: Describe the procedure for AUG?**

A:

- No preparation required; walk in patient
- Explain the procedure
- Consent
- Check every one is wearing lead apron; check machine
- Pt. Positioning
  - Supine in table (shoot 1... scout film )
  - Now turn the patient 45° oblique
  - Lower leg 90° flexed at hip
  - Upper leg straight
  - Lower arm flexed under head
  - Upper arm straight across the table
  - A single open gauze piece is loosely tied to glans corona

Contrast: Hypaque 60% Media- **Meglumine Diatrioxale**

- Dilute 1:1 make 20 ml solution (10+10)
- Fill 20 ml syringe with attached soft I.V cannula hub.
- Introduce the hub in meatus or use a 10 fch foleys with 1 ml bulb inflation in fossa navicularis
- Start Dynamic Screening
- Slowly inject contract solution 20 ml
- See for image & store;
- take left lateral & Right lateral images
- Take a voiding film & post void film

### **Q: What do you use for AUG, a foleys catheter or something else?**

A: we in our institute use syringe with soft i.v. cannula hub

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the parts of anterior urethra?**

A:

- Meatus
- fossa navicularis
- pars pendular
- Bulbar urethra

**Q: what are the landmarks you know in AUG?**

A:

- beginning of bulbar urethra- see soft tissue shadow of penoscrotal junction
- Bulbo membranous junction-at the level of lower margin (rim) of obturator foramen
- Verumontanum- see the dark shadow of Verumontanum against white contrast at the broadest area in prostatic urethra
- Bladder neck-at the upper margin of pubic symphysis

**Q: What will you see in a RGU (AUG) film study?**

A; plain Film: Bones / spinal abnormalities / stone / calculus / calcification

Contrast film:

- Length of urethra
- Site and Length of stricture
- Extravasations of contrast if any
- Type of stricture → inflamed, → non inflamed / Traumatic
- Status of Proximal urethra & Bladder
- Bladder diverticulations

**Q: what is Cobb's collar?**

A: Moorman's ring – it is VCUG finding

- Congenital urothelial remnant of type III valves → cobb's collar → may represent persistence of cloaca
- Seen distal to incisura (in bulbar urethra)

**Q: Can you assess spongiositis on AUG?**

A: A rough idea about spongiositis can be obtained but USG (espl. Real time USG penile urethra with jelly / saline filled) gives a better idea (Mc annich & Moorey et al)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: why do you want to know the degree of spongiofibrosis?**

A: Predicts the outcome of stricture repair & help in choosing the operating modality

Stricture length	Spongiofibrosis	Opn
<1cm	-	VIU
<1cm	+	End to End Excision Repair
>1cm	+/- (doesn't matter)	Substitutional urethroplasty

**Q: what else can be done to evaluate the nature of stricture & spongiofibrosis?**

A: MRI

**Q: what do you do in your institute to evaluate the fibrosis?**

A:

- We go by the length of stricture
- Appearance of stricture
- No. of attempts at VIU

Length of stricture	Appearance	Previous VIU	Present plan
<1cm	Clean	Nil	=VIU
1-2cm	Clean	Nil	=VIU
1-2cm	Inflammatory	+	=Excision end to end
>2cm	Inflammatory	-/+	=Substitutional urethroplasty

**Q: how do you assess the urethra proximal to stricture?**

A: usually the proximal urethra (proximal to stricture) distends due to closed external sphincter & contrast entrapment b/w ext. sphincter and stricture

- In cases when no contrast passes through the stricture a VCUG is done (usually such pts have SPC deployed already)
- If the pt has already deployed foleys catheter a VCUG is done before AUG, fill the bladder with contrast (through same Foleys) → remove Foleys → shoot VCUG
- However it is always best practice to take a voiding film as part of AUG (mc cullum & collapinto et al)

**Q: what are the ind<sup>n</sup> of VCUG?**

A; ind<sup>n</sup> of VCUG

- Bladder injury
- VUR
- Post op evaluation following radical Prostatectomy (before catheter removal @ 21 days)
- Following cryo Rx of Prostate
- Bladder status before renal transplant post PUV,
- female Urethral stenosis

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: in which conditions the posterior urethra fills in static film of VCUG?**

A: Neurogenic bladder  
Intrinsic sphincter deficiency  
Post TURP

**Q: what is normal diameter of adult urethra?**

A:

- The male urethra is 8 - 9 mm in diameter.
- The external meatus is 8 mm in size and normally appears as a vertical slit.
- the fossa navicularis is 10 — 11 mm in diameter.
- The pendulous urethra in the corpus spongiosum is 9—10 mm in diameter.
- The bulbous urethra situated at the proximal end of the corpus spongiosum is 11—12 mm in diameter. The membranous urethra is 9 mm in diameter, short in length (1.5—2.0) and fixed.

**Q: What is significant stricture?**

A: 5mm = 15Fr = area 20mm<sup>2</sup> (25% of normal)

**Q: what are the factors determining result?**

A:

- Length of stricture, position
- Degree of spongiofibrosis, inflammation
- Mode of injury / stricture
- No. of previous attempts of VIU

**Q: what are the good factors?**

A:

- Length < 1 cm
- Location = bulbar

**Q: what are the options available for USD Mx?**

A:

- Urethral dilatation (balloon dilation is safest)
- VIU
- End to end Anastomosis
- Substitutional Urethroplasty
- Stents

---

**Urethral dilatation**

**Q: What is the role of metal Blind dilation?**

A: In expert hands – can be safe,

- Used for radial uniform stretching of stricture without bleeding
- Ideally Maximum dilatation up to 24 Fch
- If bleeding occurs – more harm is done
- Balloon dilation is much safer

**Urethral Dilatation**

- Dilatation is only a palliative management tool and not a definitive cure.
- This is usually reserved for patients who are not candidates for more aggressive surgical intervention.
- The least traumatic and safest methods are serial catheter dilatation over several weeks or balloon dilatation.
- Dilatation potentially cures only pure epithelial strictures with minimal to no spongiosclerosis.
- To be effective, the scar needs to be stretched without causing more scarring. The best chance for this is to stretch the scar without causing bleeding. Bleeding from the urethra means that the scar was torn and the stricture will soon recur and result in worsened stricture length and density.
- Overall, long-term success is poor and recurrence rates high.



**Van Buren Urethral Sounds**



**Dittel Urethral Sounds**



**Lister's urethral sounds**



**Hank urethral sounds**



**Rosebud Urethral Sounds**



**Hegar Sounds**



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: describe the technique of male urethral dilatation?**

**A: Technique of dilatation**

The easiest position for dilatation is the supine position.

Patient reassurance and relaxation are of great help.

use local anaesthesia lignocaine jelly and retain there for 5 minutes by pinching of the external meatus.

The operator stands on the right side of the patient and grasps the penis wrapped in sterile gauze in his left hand.

The first dilator to be used is of size 6/9 (English gauge) or 16 (French gauge). This has a bulbous blunt tip and its weight often automatically dilates a urethral stricture. If this does not succeed, progressively thinner dilators are used, using greater care as the sharp point of the smaller sized dilators can easily traumatize the urethra.

The dilator is passed back down (towards the floor of the urethra), till it is arrested, then a rapid rotatory movement away from the operator is used to bring the dilator around, 180 degrees, so that the tip now points towards the roof of the urethra, and at the same time the handle of the dilator is depressed. The dilator easily enters the bladder by this maneuver.

After leaving the dilator in for a few seconds, to allow elastic tissue to elongate and bundles of collagen to slip over each other and widen the urethra, the next dilator, one number up, is used proceeding gradually to size 9/12 E or 22Fr.

**Q: what are the different size systems for dilators?**

A: The French system of marking dilator size appears to be a rational one. Size 18 Fr. indicates that the circumference of the dilator is 18mm. The English system' indicates the relative sizes of the tip and shaft (7/10) and not the circumference in mm.

**Q: what advice is given at the time of discharge after urethral dilatation?**

A: to do regular self dilatation using K-90 or Nelaton catheter

**Q: how are these catheters stored in between two dilations?**

A there are two ways

- Dry storage- wash the catheter thoroughly after use and keep it in dry air tight plastic container.
- Wet storage- wash the catheter thoroughly after use and the catheter is stored in jar of antiseptic solution such as Betadine

**Q: What is the technical name of VIU & instrument?**

A: Direct Vision – Internal Urethrotomy DVIU

Instrument- Sacche's urethrotome/ 21 Fch / with side channel

**Q: What is the principle of VIU?**

**A:**

**Internal Urethrotomy**

- Internal urethrotomy (surgical incision into the urethra for relief of stricture) encompasses all methods of transurethral incision or ablation to open a stricture.
- The goal of cutting a stricture is to have epithelial regrowth before scar recurs in the same area. At best, the result of urethrotomy is to create a larger caliber stricture that does not obstruct urination.
- Urethrotomy is potentially curative for short strictures (less than 1 cm) that have minimal spongiosclerosis.
- After each successive urethrotomy, there is a period of fleeting good urinary flow, followed by a worsened degree of spongiosclerosis and lingering stricture. There are also reports of lumen (cavity) obliteration, as well as hemorrhage (heavy bleeding), sepsis (a serious, body-wide reaction to infection), incontinence, erectile dysfunction, glans numbness and abnormal erection caused by disease rather than sexual desire.
- In the short-term (less than 6 months), success rates are 70 to 80 percent. After one year, however, recurrence rates approach 50 to 60 percent and by five years, recurrence falls in the range of 74 to 86 percent (depending on stricture length and degree of spongiosclerosis).
- Attempts to improve the mediocre long-term results of internal urethrotomy have been made with laser urethrotomy. Contact mode Nd:YAG lasers have been used to "chisel" out the scar. However, results are not superior to standard techniques.

**Q: what is the type of healing in VIU?**

A: Secondary healing

**Q: At what position do you incise VIU cut?**

A; we do it @ 12 o'clock

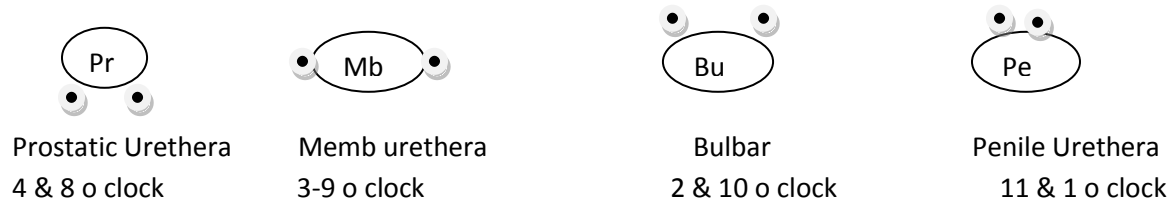
Dis adv

- Corpus spongiosum is thinnest in anterior bulbar urethra and even a single 12 o'clock cut may penetrate spongiosum and may enter the triangular ligament
- DVIU cuts (12 o'clock) can destroy the vascularity of future bed of BMU graft



A-VIU using cold knife , B- VIU using holmium laser. C pre VIU-cut .D post incision appearance

**Q: What are the positions for cavernosal nerves w.r.t urethra?**



**Q: what is the ideal direction of cuts?**

A: In bulbar urethra either 3 o'clock or 9 o'clock or Mercedes sign cut @ 12, 4, 8 o'clock  
Mercedes Benz cut: 12,4,8 for protecting cavernosal nerves which are at 3' & 9' o'clock

**Q: What is success rate of VIU?**

A:

- For stricture length <1cm = 70%
- For stricture length 1-2cm = 35%
- For stricture length >2cm = 10%,
- in general 30-35% success (pansadaro et al)

**Q: what is the definition of success / failure?**

A; success = no recurrence till 3 yrs

Failure = Peak uroflow  $Q_{max}$  of < 15ml /sec

**Q: When will you remove foleys after VIU?**

A: 3-5 days

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Is there any role of urethral intra lesion steroids in urethral stricture Mx?**

A: no

**Q: What is the role of CIC after VIU?**

A: Yes, Using Nelaton Catheter (= 14 FCH, K-90)

M/C protocol is once weekly for 1 yr (kajeer-guard – 1988)

**Q: What is the role of repeat Urethrotomy?**

A: Repeat VIU can be done if stricture recurrence is after 3 months. No role if stricture recurs within 3 months

**Q: What is the famous series on VIU?**

A: Pansadaro

**Q: what are the compl<sup>n</sup> of VIU?**

A:

- Bleeding
- Recurrence of stricture
- Meatal injury due to Sacche's sheath
- Breaking of knife blade

**Q: How will you fl/ up?**

A:

- Baseline uroflow & AUG @ post op 6 weeks
- Uroflowmetry @ 6 monthly x 2 yrs
- Alternately a flexible cystoscopy can be done as office procedure
- Readers are requested to check this answer and answer what is done in their respective institutes

**Q: In what time (post operatively) a stricture can recur?**

A: VIU treated stricture will recur usually in 6 months or at most within one year.

**Q: what is endoscopic urethroplasty?**

A;

Urethrosomy → VIU → resect the fibrous area with

- Mark the distance with cystoscopy --. Get a Foleys
- Mark the area corresponding → fix the SSG graft over foleys
- SSG graft → push Foleys in bladder under fluoroscopy guidance → inflate bulb
- Put a SPC for urinary diversion, to avoid peri urethral leak

Other modifications:

1. Transperineal needle insertion under cystoscopic guidance to fix to the graft SSG

## **Neeraj Sharma's ...Notes For Urology Practicals**

2. Balloon dilators → fix graft over balloon dilation go upto strictured area (after bed preparation)

- Inflate the balloon & leave it there for 7 days

- On 7<sup>th</sup> day deflate balloon & come out

**Q: how are the results?**

A: so far so good but not established.

**Q: what is the size of such free SSG graft?**

A:

- Length 2cm more than stricture length
- Breadth = 2cm
- Thickness = 0.5 cm

### **DVIU- Direct vision – Internal Urethrotomy operative procedure**

Ind<sup>n</sup>: Short segment 1-2 cm anterior urethral stricture

C/Ind<sup>n</sup>:

- Long segment stricture > 2cm
- Dense fibrosis
- More than 1 attempt of previously failed VIU
- UTI
- Coagulopathy

Pre op evaluation:

- AUG+ MCU
- Urine culture- negative
- Coagulation profile normal

Preparation:

1. Local part preparation ; b'coz need for SPC need for antegrade approach
2. Antibiotics as per culture

Anaesthesia: S/A, G/A

Position : Lithotomy position

Procedure:

1. Dorsal lithotomy position
2. Painting & drapping
3. Uretheroscopy for evaluation of urethra → do not cross stricture
4. Deploy guide wire across stricture (position of guide wire can be checked with IITV if in doubt)
5. Take Sacche's urethrotome sheath i.e., blind obturator. Introduce the sheath i.e. Blind obturator to avoid injury to meatus & distal urethra.
6. Remove obturator and introduce the Sacche's blade

## **Neeraj Sharma's ...Notes For Urology Practicals**

7. Stabilize the penis with one (left) hand. Advance the blade into stricture and with an upward anterior stroking release the lever; the blade is retracted back into sheath while cutting the stricture. Cut across the stricture @ 12 o' clock
8. Cut the full thickness till bulbospongiosus is seen (light pink appearance)
9. Keep advancing the sheath & cutting
10. Reach the bladder & do Cystoscopy
11. deploy zebra guidewire through the side channel of VIU sheath
12. Place 18F foley catheter over guidewire .
13. Half-moon sheath can also be used for deploying Foleys catheter. If half-moon sheath needs to be used then it is preloaded on VIU sheath before doing VIU.

Post OP:-

- Remove Foleys after 3-5 days
- Continue antibiotics for 5-7 days
- Anticholinergics may be added if needed.
- Patient is advised to do self catheterization / dilation as per the case
- Fl/up @ 3 months for uroflow.

**Q: what is the self dilation protocol you use?**

A: 14 F, straight catheter, once daily x 15 days and then tapered gradually

**Q: What are the compln of VIU?**

A; Early

- Hematuria
- Bleeding
- Infn

- Late

- Fistula
- False passage
- incontinence
- recurrent stricture
- Erectile dysfn.

**Q: What else can be used for VIU, other than cold knife?**

A: Laser HO: YAG

**Q: How will you do laser VIU?**

A; No need of Sacche's urethrotome / sheath.

Uretheroscopy → Deploy guidewire → remove Cystoscope → Re-enter along side of G.W →  
→200 or 365 μ HO:YAG laser through side channel → Low energy settings 5Hz,0.5 J or 10Hz, 1.0 J →  
→fire→cut across→ reach bladder→ change G.W→Deploy Foleys.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What are the advantage / disadvantages of laser?**

**A: advantage-** Ideal laser should vaporize stricture (& no necrosis)

No Bleeding, Less injury chances to cavernosa, less chances of erectile dysfn.

**Disadv:** cost and availability

---

### **End to end Anastomosis**

**Q: what is the best technique for Anterior U.S.D < 2 cm?**

A: Russell's end to end Anastomosis

**Q: What are the principles of E-E-A?**

A:

- Complete excision of fibrosis
- Spatulate the urethra & oval / ovoid anastomosis
- Mobilization of spongiosum

**Q: What is the ideal stricture length?**

A: - up 2 cm

**Q: what is the difference between E to E Anastomosis for Bulbar stricture & pendulous urethra?**

A: Bulbar E-E-A can be done upto 2 cm as bulbar urethra can be mobilized

Pendulous urethra is fixed to spongiosum so defects less than 1 cm defect can be closed.

**Q: what will happen if E to E Anastomosis is done for longer (more than 1 cm ) stricture in Pendulous urethra?**

A: buckling deformity

**Q: What is the Best repair tech. for short segment anterior Urethral stricture?**

A: Russell's end to end Anastomosis (EEA)

**Q: what are the Principles of E-E-A?**

A:

- Complete excision of fibrosis
- Spatulate the urethra
- Ovoid anastomosis
- Tension free anastomosis,
- mobilization of Spongiosum

**Q: what is ideal stricture length for E-E-A?**

A: upto 2 cm

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: Describe the procedure of E-E-A?**

A: Anesthesia G/A, S/A, E/A

Do primary cystoscopy first

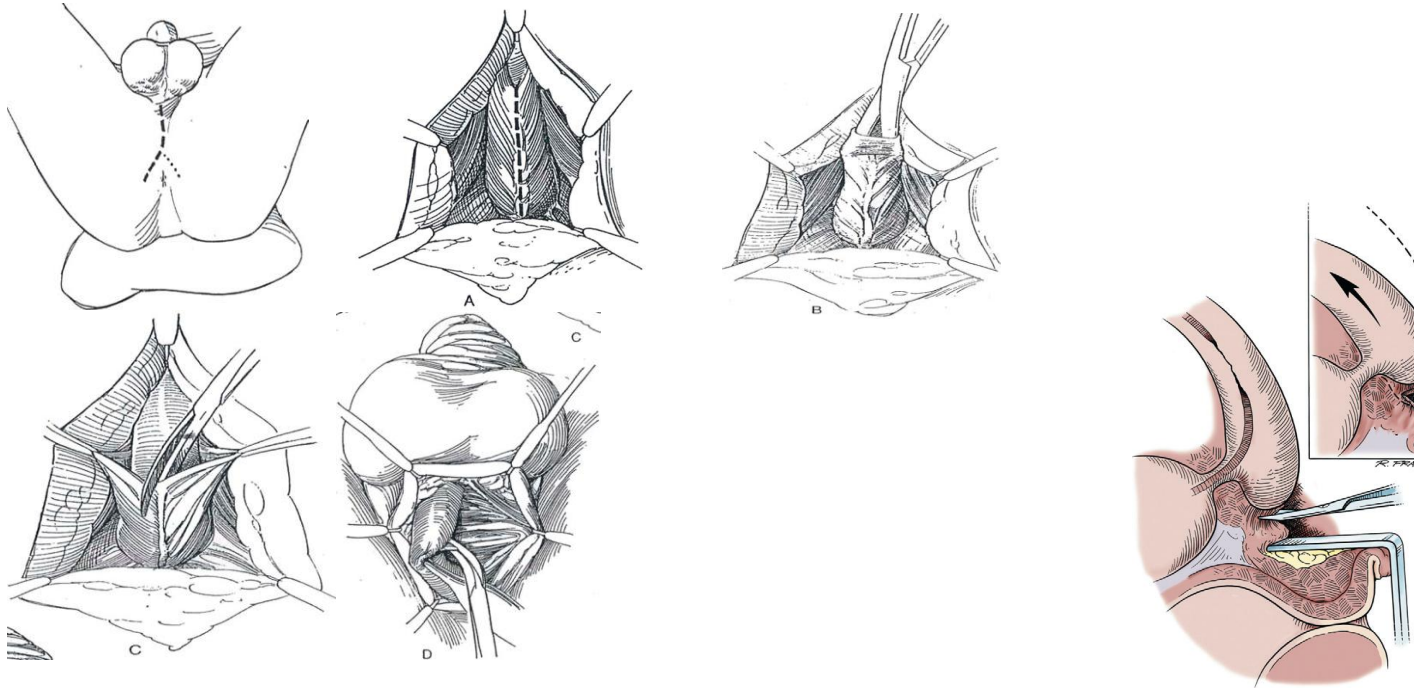
Position: extended high lithotomy / holding stitches in scrotum

Incision: Midline perineal

- Open the skin , subcut tissue
- Dissect the Bulbo-spongiosus, retract it / divide in midline
- Loop the corpus spongiosum; mobilize the corpus spongiosum distally towards penile urethra  
Turner – Warwick – Ring – Retractor (perineal)
- Pass a Foleys through meatus and assess the penile end of stricture
- Palpate the stricture and re-assess length
- Take stay sutures for orientation
- Excise the stricture
- 28 Fch straight dilator calibrated in to prostatic urethra
- Deploy SPC catheter under vision
- Prostatic end spatulated @ 6 12 o clock
- Penile end spatulated @ 6 o clock
- At penile urethra tack the urethral mucosa with spongiosum by taking 4-6 full thickness intermittent stitches
- Take all the sutures 12,2,4,6,8,10 through both ends and keep tagged with mosquito forceps
- Tie 6,4,8 positions anastomosis
- Deploy 18 fch silicon; inflate bulb
- Complete 12,2,10 position
- Deploy mini vac drain
- Close Bulbo spongiosus
- Deploy another drain (optional)
- Close the wound
- Fix urethral Foleys to abd wall
- Compression dressing



## Anastamotic urethroplasty



### **Q: Describe the post op care?**

A: Drain removal 3<sup>rd</sup> day POD

Foleys removal @ POD- 21 & VCUG

If VCUG is normal, clamp SPC and remove SPC after 7 days

If VCUG → leak, then redeploy Foleys under vision over guidewire

### **Q; Suppose the Gap is more; how can an E-E-A still feasible?**

A:

- Dissection of Bucks fascia
- Development of Inter-crural Space
- Detachment of Bulbo-spongiosus from perineal body

### **Q: What is Jordan's Technique?**

A: Vessel sparing E-E for Bulbar Stricture

Bulbo Urethral artery B/O common penile Art B/O int. pudendal art B/O int iliac artery

### **Q: what are the compln of E-E-A?**

A: Anastomotic leak

Stricture

Ischemic stenosis of urethra

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the success rate of E-E-A?**

A: for properly selected patients > 90%

**Q: What is the status of Russell's E-E-A in penile urethra?**

A: In penile Urethra, E-E-A is not possible for stricture more than 1 cm without causing significant buckling of penis even at rest, let alone on erection. The Options in penile urethra stricture are-

- Stricturotomy & Patch(skin/BMU)
- Total Excision & Circumferential reconstruction
- Johansson's / Brakka two stage procedure

**Q: What is the general rule of E-E-A?**

- Closer the stricture to memb urethra; more are the success chances of E-E-A .

**Q: What is Jordan's Technique?**

- Vessel sparing E-E-A for Bulbar stricture

**Q: what can be done for long (>2 cm) Anterior USD?**

A: Graft Urethoplasties two stages

One stage	two
stages	
- Barbagli	- Brakka, -
Johansson	

**Q: How can you do E-E-A for strictures >2 cm?**

A:

- Mobilize bucks fascia
- Development of intra-crural space
- Detachment of Bulbo-spongiosus from Perineal body

**Q: How will you safe guard the anastomosis?**

A: By Turner-Warwick roof plasty using corpora Cavernosa.

**Q: what are the indications for E-E-A?**

A:

- Partial/complete rupture of bulbar urethra
- Distraction injury of memb urethra
- Short strictures of ant. Urethra.

**Q: what radiological investigations (I<sub>x</sub>) for E-E-A?**

A: RGU (std. lateral position) & MCU → (in Lowenstein position) (or combined RGU + MCU) same plate

**Q: What is Lowenstein position?**

A: frog leg position in supine

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you assess spongiofibrosis?**

A: 10 MHz USG probe

**Q: What is floor strip/Roof strip anastomosis?**

A: When the stricture is obliterated one & excised, a narrow strip of urethra is anastomosed where as rest of neo-urethra is built by graft / flap.

---

### **Barbagli Graft Urethoplasties**

BMG GENERAL

**Q: what is Monsieur Repair?**

A: Dorsal urethrotomy & **suturing** the urethral open edges to triangular ligament or corp. cavernosa

**Q: what is Barbagli's repair?**

A: Dorsal **Urethrotomy** + BMG graft pasted over triangular ligament / corp. cavernosa + Urethral Margin sutures to BMU graft edges

**Q: what is the most common graft material used?**

A: buccal mucosal graft (BMG)

**Q: from where can BMG graft be taken?**

A: Cheek (watch for Stenson's duct)

Lower lip (don't go near margin of lip)

**Q: what all skin / mucosa can be used?**

A; Penile Skin

Inner Prepuceal skin

Buccal Mucosa

Bladder Mucosa

Rectal Mucosa

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Which is better lip or cheek?**

A: Cheek; b'coz of width

**Q: Why Buccal mucosa is used for urethoplasty?**

A:

- Easy accessibility and handling
- Resistance to infection
- Compatibility with a wet environment
- A thick epithelium and a thin lamina propria allows early inosculation
- Good medium-term results which are at least comparable with full-thickness skin grafts

**Q: what are layers of Buccal Mucosa & skin?**

A: Buccal Mucosa

- Oral Epithelium
- Lamina propria → superficial, → deep
- Muscularis & Salivary glands

Skin →

- Epidermis
- Dermis – papillary, Reticular

**Q: who devised BMG who propagated it?**

A: Devised → Humby,

Propagated → Barbagli

- Guido Barbagli from Arezzo, Italy published his innovative technique of dorsal onlay free graft urethroplasty in the journal of urology in 1996
- Barbagli initially used free prepuccial skin graft as a dorsal onlay. Later on he started using buccal mucosa graft

**Q: what are the C/I for graft (= Indn for flaps)?**

A: H/O Radiotherapy

H/O **Devascularized** bed

Revision surgeries

**Q: What are the steps of graft uptake?**

A: Imbibition 1-2 days (graft survives on serum)

Inosculation 3, 4, 5 ds (formation of new vessels)

**Q: what are the types of graft?**

A: full thickness = Wolfe graft (wolFull thickness)

Split Thickness – Thiersch (spliThiersch)

**Q: What type of grafts are BMG & inner Prepuccial?**

## **Neeraj Sharma's ...Notes For Urology Practicals**

A: full Thickness grafts (does not contract)

**Q; what is width of BMG?**

A: 2cm – 2.5 cm

**Q; why full thickness grafts do not contract?**

A: B'coz they have critical amount of dermal collagen

**Q what are the layers of skin?**

A.

- Cornified layer (keratin)
- Epidermis
- Dermis-1. Papillary,  
2. Reticular

**Q: what is STSG & its composition?**

A; Split thickness skin graft

Cornified layer + epidermis

**Q: what are the Adv / disadvantages of SSG?**

A:

- Better uptake & survival
- Large covering area
- No need to cover donor site
- But contracts (disadv.)

**Q what are the layers of bladder and buccal mucosa?**

A .Layers of Bladder

1. Epithelium
2. Lamina propria
3. Detrusor muscle
4. Peri vesical fat

Buccal Mucosa

1. Oral Epithelium
2. Superficial lamina
3. Deep Lamia
4. Muscularis and glands

**Q: What is an island flap?**

A: skin Island elevated on a fascia / muscle

**Q; what acellular material can be used as graft?**

A:

- Collagen Matrix
- Small intestinal submucosa (usually heterologous)
- Tissue engineered urethra

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q; what are the adv of Buccal Mucosa?**

A:

- Easily accessible
- Easy Handling
- Resistant to infn
- Compatibility with wet environment
- Thick epithelium & thin lamina propria → easy inosculation
- Results comparable with full thickness graft

**Q: what is the impact of previous VIU?**

A: VIU is done @ 12 o'clock position ; this is also site of bed for graft. Thus VIU causes damage to corp. cavernosa,

Adherence of corp. spongiosum of albuginea &  
↑fibrosis and increase in length of stricture

**Q: what type of grafts are inner prepuce grafts and buccal mucosal graft?**

A: Both are full thickness

**Q: what is peculiarity of these inner prepuce grafts and buccal mucosal grafts ?**

A:

- Even though full thickness they are thin grafts
- Practically behaves like SSG
- No contractures (full thickness property)
- Non hairy
- Very high vascularity

**Q: what is Wolfe graft & Thiersch graft?**

A: Wolfe graft ----Full thickness graft

Thiersch graft →SSG

**Q: name a few famous graft surgeons?**

A;

- Humby- father of skin grafting...(Humby's SSG knife handle)
- Devine and Horton
- Turner **Warwick**
- Blandy
- Duckett
- Barbagli

**Q: what is the Comparison b/w graft & flap?**

A:

- Flaps are tedious, time consuming
- Grafts are easy to use, harvest & deploy
- Grafts are procedure of choice

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are C/Indn for graft = Indn for flap operations ?**

- H/O of radiotherapy / or any such cause for devascularized bed
- Revision surgeries
- Local infn

All above hinders the graft uptake so flap is better

**Q: what is the status of uretheroplasty graft in posterior urethral stricture (prostatic & membranous)?**

A: No role.

---

### **BMG PROCEDURE**

**Q: what do you do in your hospital?**

A: Barbagli = dorsal onlay Substitutional Uretheroplasty

**Q: what is Barbagli Repair?**

A: Dorsal onlay Substitutional Uretheroplasty

**Q: What all grafts can be harvested and used for Barbagli Repair ?**

A:

- Penile shaft skin (stricture < 4 cm)
- Prepuce (stricture > 4 cm)
- Buccal Mucosa

**Q: What is the disadv of VENTRAL onlay?**

A: requires spongioplasty

**Q: what are the Lumen criteria for single stage BMG onlay?**

A: Minimum 06 FCH urethral lumen for single stage BMG onlay ( 6 Fr lumen = 6 mm wide urethral lay opened plate)

**Q: according to the site of stricture which BMU has better outcome bulbar or pendulous?**

A: Bulbar BMG has Better outcomes than Pendulous BMU repair.

**Q: What graft will you take in tobacco chewer?**

A: Lingual

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What are the Indications for BMU?**

A: Indications for BMU are....

1. Urethral reconstruction @ BXO
2. Distal penile strictures
3. Reconstruction of fossa navicularis
4. Bulbar urethral strictures
5. Middle & proximal hypospadias
6. Pan-Urethral stricture
7. Re-do-hypospadias

### **Q What are the Pre op Preparation for BMU?**

A.

1. No urethral trauma for 3 months before surgery
2. Urine routine micro, Urine culture sos
3. Antibiotic cover
4. Bowel preparation
5. On table shaving

### **Q: what is the preferred Anaesthesia for BMU operation?**

A: nasal intubation

### **Q: what are the types of onlay graft urethoplasty (O.U.)?**

A: 1 ventral, 2. lateral, 3. dorsal onlay urethoplasty (O.U.)

### **Q: what are the dis. Adv of ventral O.U?**

A:

- Spongioplasty is required
- Results are inferior to dorsal O.U

### **Q: what is monsieur's repair?**

A: Dorsal Urethrostomy, through the stricture bed and stitch the urethral edges to Triangular ligament of cavernosa (same as dorsal onlay urethoplasty but without graft)

### **Q: What is Barbagli's repair?**

A: Dorsal onlay graft urethoplasty graft is spread over triangular ligament.

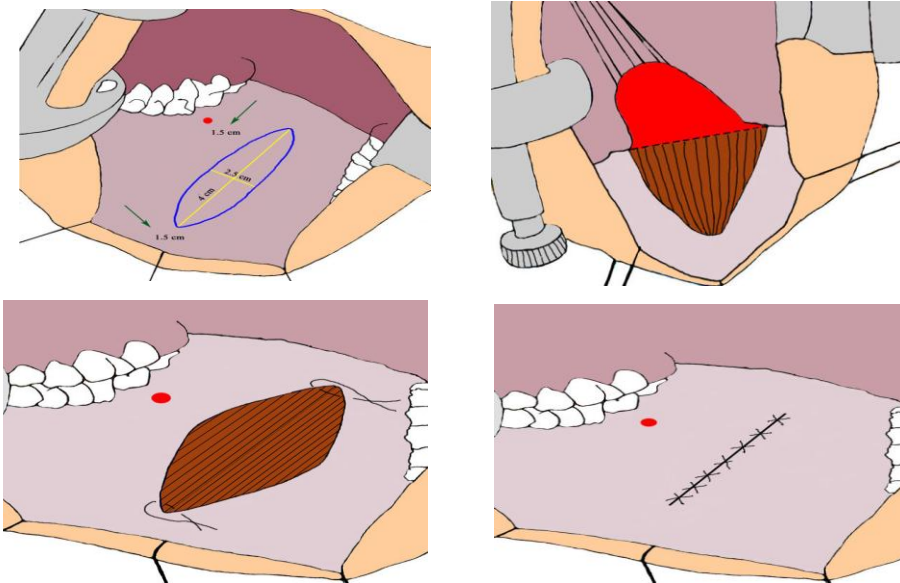


**Q : Describe the BMG harvesting procedure?**

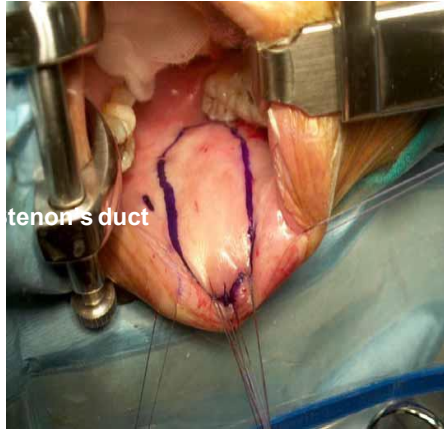
**A**

- The graft is taken under general anaesthesia
- A retractor is placed to wide open the jaws
- A roller gauze is packed into the pharynx to block aspiration of blood during dissection
- The Stenson's Duct opening opposite the second upper molar tooth is marked with Methylene Blue
- Injury to the duct opening is avoided by making an incision from the angle of mouth towards the *lower jaw*
- Xylocaine with 2% Adrenaline A stay suture is taken at the angle of mouth just inside the vermilion border
- The buccal mucosa graft is kept in a bowl of saline to which Gentamycin injection is added
- The defatting of the graft is performed

## BMG



## BMG

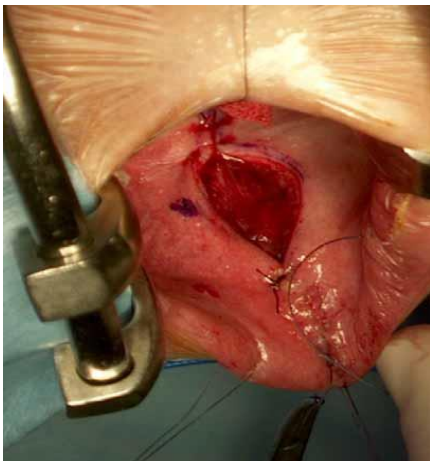


The harvesting site is underlined



The graft is 4 cm long and 2.5 cm wide

## BMG



The harvesting site is closed

**Q; Do you close the donor site?**

A; no

**Q; what is the name of retractor & Gag used for harvesting BMG?**

A; Denhardt mouth gag

Baby sweet heart retractor

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the standard BMU Graft size?**

A: Atleast 1.5 cm wide, length varies from 2 cm to 15 cm

**Q: what is the Width of BMG?**

A: width 2.5cm, Length as required

**Q; Should BMG Donor site be closed?**

A; No need,

Closing can cause

- Hematoma collection
- Stenson's duct entrapment
- Disfiguring
- pain

Not closing causes- pain, Ulcer, - delayed oral diet

**Q: Which is better inner lip mucosa or cheek mucosa for BMU?**

A: cheek, b'coz it has more width

Advantages

- Available in all patients
- Two grafts, thick, long and large
- Donor site scar is concealed

Disadvantages

- Harvesting procedure may require nasal intubation or special retractor
- Risk of injury to Stenson's duct

**Q: what is the additional OT time required for BMU?**

- Additional 30- 45 min; so two team approach is better.

**Q: what structure should be watched for while taking BM Graft?**

A: Stenson's duct

**Q: what is the anatomical location of Stenson's duct?**

A: opposite upper 2nd molar tooth

**Q Do you close the donor site or leave it open?**

A . In our institute we do not close the donor site

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: when and how Donor site should be closed?**

A: Chronic catgut interrupted suture

Indications for donor site closure

- Excessive bleeding
- Multiple grafts taken from same cheek

**Q: what are the complications at donor site?**

A:

1. Scarring can cause change of facial expressions
2. Lower lip inversion
3. Infection, ulcer

**Q: how will you store graft?**

A; ideally..... In Gentamycin soln till use

Practically ....in normal saline

---

### **Perineal part**

**Q: describe the procedure?**

A

- Graft placed over the corpora cavernosa with mucosa facing towards the lumen.
- Graft is spread and fixed to the corpora cavernosa.
- Edge of the corpus spongiosum sutured to the buccal mucosa over a 14 F silastic catheter is inserted into the bladder.
- Each stitch incorporates the underlying corpora cavernosa, the buccal mucosa and the corpora spongiosum.

## Dorsal onlay

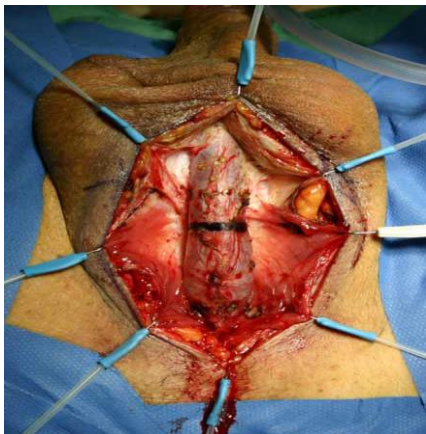


**Methylene blue is injected into the urethra**

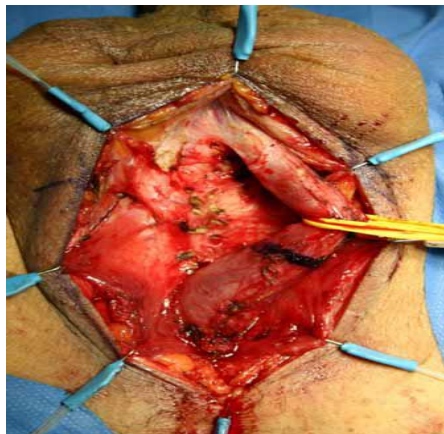


**The distal extent of the stricture is identified by inserting a 16-French catheter with a soft round tip**

## Dorsal onlay

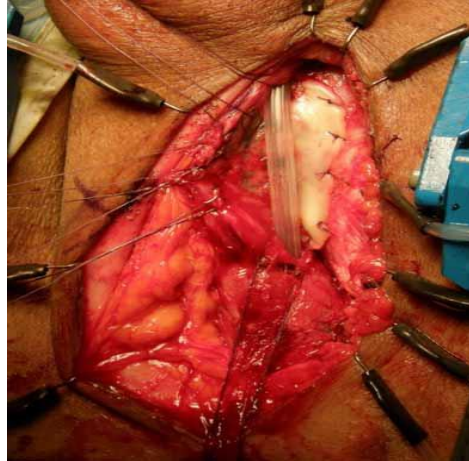
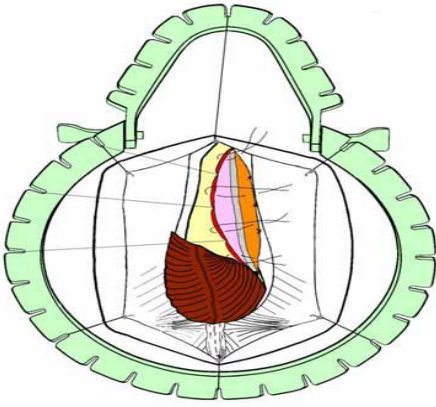


**The distal extent of the stricture is identified and outlined**



**The urethra is dissected from the corpora cavernosa**

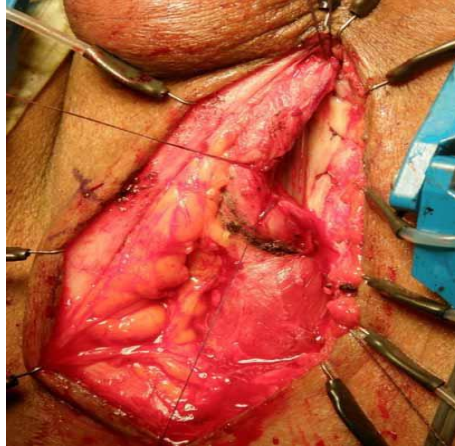
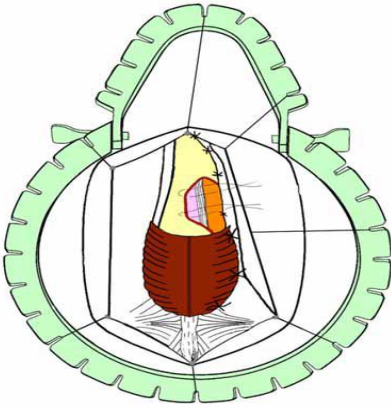
## Dorsal onlay



**Foley 16 Ch silicone catheter is inserted**



## Dorsal onlay



**The urethra is sutured over the graft**



**The perineal wound is closed**

**Q: where will you take stay sutures in urethra?**

A: On lateral edges of cut open urethra to keep the urethral edges wide open

**Q: Why strictured portion of urethra cut in midline?**

A: incising in midline preserves the erectile fn

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Why do you cut stricture urethra in midline?**

A: Preserves erectile fn

**Q: Where is BMG fixed?**

A: 1. over triangular ligament  
2. over albuginea of corp. cavernosa

**Q: How will you fix the graft?**

A: Interrupted vicryl / PDS

**Q: What size Foleys will you deploy?**

A; 18 Fch silicon

### **Ventral onlay urethroplasty**

- In the bulbar region the urethra lies dorsally in the corpora spongiosum.
- It is possible for us to use the buccal mucosa graft as a ventral onlay
- and then overclose the spongiosum to cover the BMG.

### **Procedure**

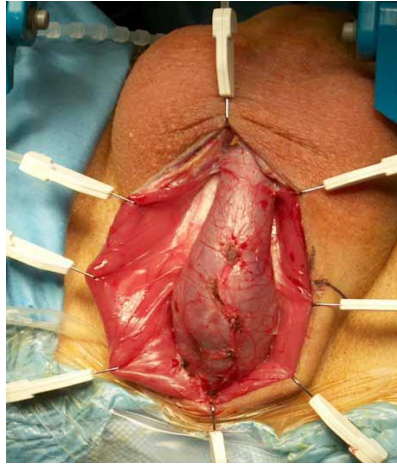
- Ventral urethrotomy is performed through the strictured urethra into normal proximal bulbar urethra upto 1.5cm.
- A 1.5cm wide and 6cm long BMG is harvested from the cheek and defatting is performed
- The BMG is sutured to the urethral mucosa with continuous sutures of 4/0 vicryl with a 14 F silastic Foley Catheter inserted to the bladder
- The corpus spongiosum is over closed with continuous sutures of 4/0 vicryl and taking bite of the buccal mucosa graft
- The wound is closed in layers. The catheter is removed after three weeks.



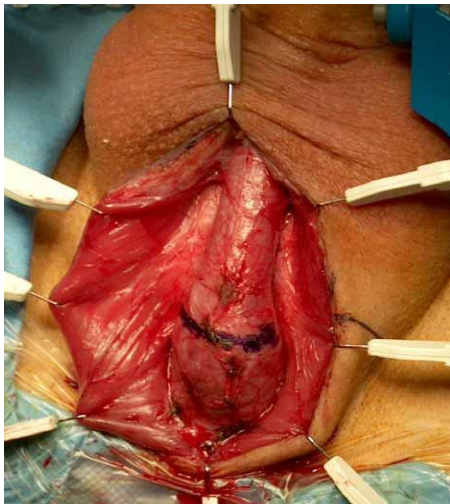
## **Ventral onlay graft urethroplasty**



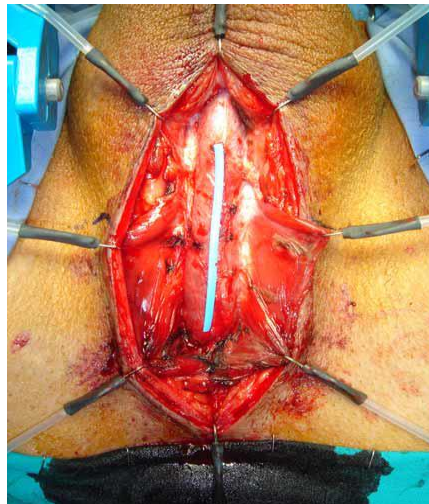
**Midline perineal incision**



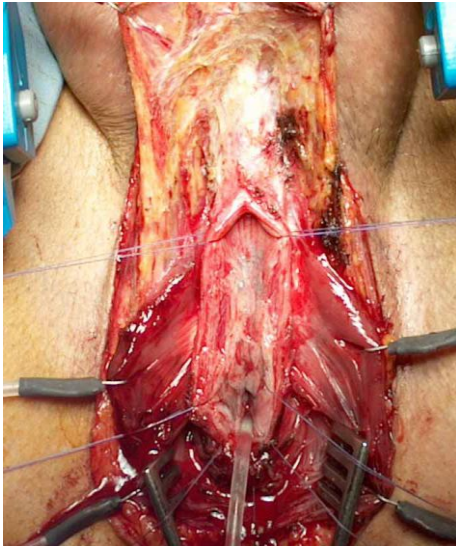
**The urethra freed from bulbospongiosus**



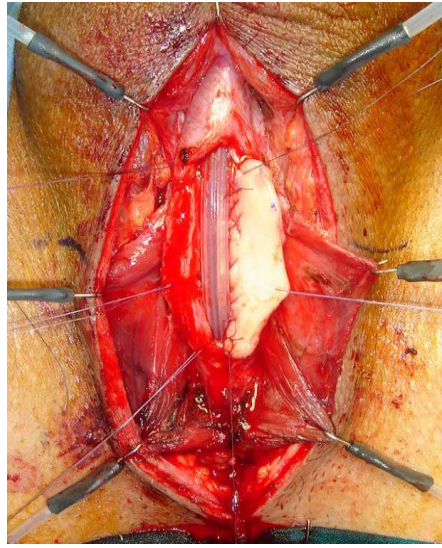
**The distal extent of the stricture is identified and underlined**



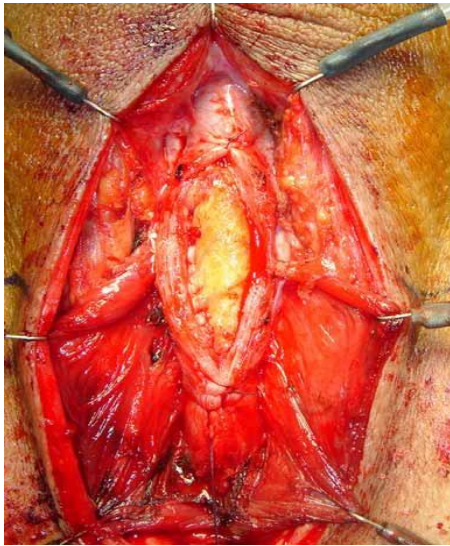
**The incision on the ventral urethral surface is underlined**



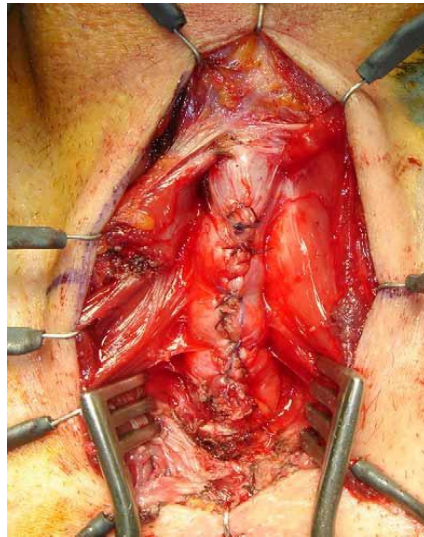
**The ventral urethral surface is fully opened**



**The oral mucosal graft is sutured to the left margin of the urethral mucosa**



**The oral mucosal graft is moved to cover the urethral plate**



**The corpus spongiosum is closed over the oral mucosal graft**



**The perineal wound is closed**

**Q; Do you deploy SPC while Barbagli Opn?**

A; no

**Q: How will you do dressing of this pt?**

A: For Barbagli repair

-Silicon catheter strapped to abdomen

-Two layer dressing

- balled compression,
- Compression dressing; 'X' dynaplast bandage

---

***Post BMG***

**Q; How will you fl/ up Barbagli opn?**

A:

- Drain removal 3rd POD
- On 21st day- Fill Bladder with contrast through Foleys- remove Foleys
- Do VCUG ,If no leak → done / finish

(If leak is present than redeploy Foleys undervision or SPC under vision)

- Fl/up uroflow @ 4 months x 1 yr

@ 6 months x 2yrs

- Do AUG / VCUG when uroflow  $\leq$  14 ml / sec (peak flow)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What are the results of Barbagli?**

A: success > 90%

**Q: What are the compln of donor site?**

A:

- Scarring
- Change of facial expressions
- Lower lip inversion
- Infn,
- Ulceration of mouth
- Stenson's duct injury

**Q: what are the compln of BMU?**

A:

- Graft Necrosis
- Recurrent stricture
- Donor site compln

**Q: What are the compln of VENTRAL only graft uretheroplasty?**

A: Lack of support to graft

- Needs spongioplasty
- Out pouching – Collection of semen/ urine,
- post urine dribbling,
- diverticulum formation

For ventral patch = Buccal graft is Better than skin

For dorsal patch buccal = skin

**Q; what is the site of recurrence of Stricture after flaps?**

A: Proximal & distal anastomosis site

Usually VIU is sufficient for such anastamotic strictures

**Q: what is the m/c infection in flaps / graft?**

A; Hemolytic streptococcus

**Q: what are the complications of stricture surgeries?**

A: Scarring, poor cosmosis, hematoma, fistula, sexual dysfunction

**Q: what is the Wessel's & Mc'Annich famous Meta analysis?**

A: Wessel's & Mc' Annich meta-analysis states that there is no difference between graft & flap in the cure rate of stricture

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What is the current status of Grafts?**

A:

- Grafts (espl. BMG) have replaced / outcasted the flaps
- Flaps are used only when there is dense scarring or poor blood supply to recipient tissues espl after previous surgery or radiotherapy
- Orandi flap is still used for penile urethral stricture

### **Q: what is the Success rate of Barbagli BMU?**

A: 80 % to 92%

Recent reports of BMG for long term outcomes are around 60 to 70 %

### **Q: when will you do RGU / AUG post BMU?**

A: Uroflow Qmax < 14ml/sec peak flow

### **Q; what is definition of failure?**

A; failure is defined when any time post operative instrumentation is needed; including dilation

### **Q what is the success rate for BMG Barbagli?**

A 80 to 90%

### **Q: when will you remove Foleys after BMG?**

A: 10-14 days in children

14 – 21 days in adult

### **Q: What are the complications of BMU?**

A.

- Urinary Fistula
- Graft necrosis
- Recurrent stricture
- Donor site complications
- Recipient site infn

### **Q: What are the indn for two stages BMU?**

A:

- Excision of large urethral tumours
- Grossly infected strictures
- Amyloid disease
- Vascular malfunctions of Urethra
- After excision of Urolume stent

### **Q: what is the decisive Day?**

A: POD-5 – graft is either sloughed off or taken up.

### **Q: which is better- onlay graft/ flap or tubularized graft/flap?**

A: Onlay is better than tubularized.

The onlay graft / flap results are > 90% in 1st year and then deteriorate every year.



---

**Grafts**

**General**

- A graft is a tissue transfer that is dependent on the host blood supply for survival. The process is called a graft "take" and occurs in two stages, Imbibition and inosculation.
- Imbibition is nutrient absorption from the host bed in the first 48 hours.
- The second phase is inosculation, which takes place from 48 to 96 hours after grafting. Inosculation is graft revascularization by blood vessels and lymph joining from the host bed to the graft.
- Conditions for graft success are:
  - Well-vascularized host bed
  - Rapid onset of Imbibition (passive diffusion of nutrients from the host bed)
  - Immobilization of the graft
  - Rapid onset of inosculation (in growth of blood vessels)
- Split-thickness skin graft comprises the epidermis (the outer, surface layer of skin) and the superficial section of the papillary dermis (thin upper layer of skin below the epidermis)
- Dermal graft comprises the deep papillary and the reticular dermis (a thicker layer of tissue found deep to the surface skin)
- Full-thickness skin graft involves all layers, the epidermis, papillary dermis and the reticular dermis.

**Free-Graft Urethroplasty**

- The primary grafts used are penile skin, buccal graft (mucosal [pink] lining of the cheeks) or outer layer of the bladder.
- Grafts are highly successful in the bulbar urethra as an onlay or patch technique and where a spongioplasty to cover the graft can be performed. Mucosa from the inner cheek is easy and quick to harvest, causes minimal sickness and has excellent take (up to 86 percent).
- Full-thickness skin grafts are used in urethral reconstruction because of their high "take," and shrink little (15 to 25 percent). Split-thickness grafts are not to be used in one-stage urethroplasty because in unsupported tissue they can shrink as much as 50 percent. Penile skin should be avoided when the penile skin is not abundant or also affected by LSA.
- Grafts are particularly useful in the obese patient with a bulbar stricture, for whom time in surgical procedure needs to be minimized.

**Meshed Graft Two-stage Urethroplasty**

This is usually reserved for patients who have undergone failed Urethroplasties or where the urethra and local skin are severely scarred. Two-stage reconstruction is also recommended when stricture is associated with a fistula or abscess, or lack of sufficient, well-vascularized local skin for a one-stage reconstruction.

A flap is a tissue transfer where the donor blood supply is left intact. The success of a flap is described as "survival" and has better overall success than grafts.

**Penile and Foreskin Island Flaps**

- Penile flaps are the mainstay of urethral reconstruction.
- Penile skin flaps rely on the rich collateral blood supply within the tunica Dartos (the thin layer muscle fibers underlying the skin of the scrotum) for their survival.
- Island flaps are versatile and can be used in all areas of the anterior urethra. Success rates of 85 to 90 percent are achieved with onlay flaps where the urethral plate remains intact. Flaps that are completely rolled into a tube have nearly a 50 percent failure rate.
- Depending on the location and the length of the stricture, flaps may have to be developed in different positions and shapes.

**Scrotal Skin Island Flaps**

- Scrotal skin island flaps are used for bulbar strictures where time in surgery needs to be minimized or where other tissues are not available.
- When mobilizing a scrotal flap of skin, care should be taken to choose a non-hair bearing area. Otherwise, a hairy urethra can result and be complicated by recurrent infection, sprayed urinary stream and stone formation. A hairless patch of skin can often be found in the midline and the posterior scrotum.
- If the scrotum is hairy, the skin island can be expanded by hair removal. After the initial hair removal, the patient is reassessed six weeks later for a second treatment.
- The disadvantages of scrotal skin over penile skin are that it is more difficult to work with, tends to shrink and has a unilateral blood supply.

***FLAP RECONSTRUCTION***

**Q; Describe the penile fascial anatomy?**

A: skin

Dartos: always goes with skin

Separate from skin when free graft is taken

Tunica Dartos:

- Deep to dartos
- superficial to bucks } in between
- Responsible for free movement of skin over shaft
- Very rich in Blood supply

Bucks:

- Deep to tunica Dartos
- Superficial to albuginea } in between
- Bucks fascia is to be lifted along with (and is the Base for ) Fascio- cutaneous flaps of penile skin e.g. (Quartey , Orandi)

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: When do you need flap reconstructions?**

A: Devascularized Bed  
H/O radiation  
H/O Previous Sx

### **Q: On whose concepts these flaps were invented?**

A: Micro inj<sup>n</sup>. Studies of Quartey

### **Q: What are the principles behind skin flaps?**

A: Non hairy, penile skin has a blood supply by dartos (tunica dartos)  
Penile skin flap can be raised on tunica dartos  
Flap can be rotated & fixed to laid open urethra  
Even tubularization of flap can be feasible.  
2<sup>nd</sup> layer covering should be done & penile skin is covered

### **Q: when is the single stage onlay flap not technically feasible?**

A: When urethral caliber (lumen) is less than 6 Fch

### **Q: How to decide what to choose; a dorsal/ ventral based island flap?**

A: if penile skin redundancy is dorsal → dorsal island flap  
If Redundancy is ventral → ventral island flap  
Dorsal island flaps have to be rotated transversely  
Ventral island flaps can be used transversely or longitudinally

### **Q: what are the different flaps?**

A: Quartey flap (Quartey transverse flaps):  
    Quadrangle piece of DORSAL penile skin flap; raised of dartos & rotated 90°  
Orandi (Orandi longitudinal flap):  
    Ventrally raised flap applied longitudinally after doing ventral urethrotomy,  
flap is rotated (inverted) on its long axis to cover the stricture

### **Q: What will you do if non-hirsutile skin is not available?**

A: Do multiple epilations @ every 6 weeks x 4-5  
    do op<sup>n</sup> after 12 weeks of last epilation  
- Do laser Rx of skin & do Sx after 12 weeks



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what operations can be done for penile urethral long strictures?**

A:

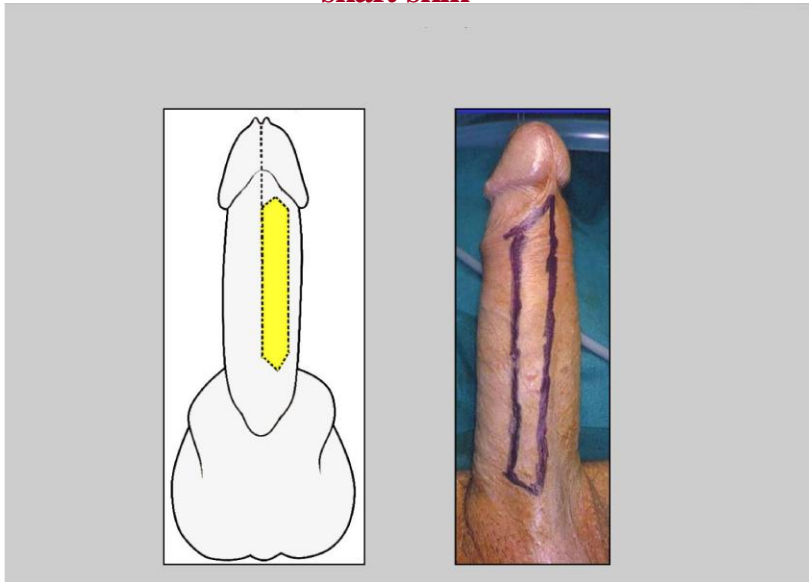
- Augmented Urethroplasty
  - Jordan flap
  - Duckett's TPIF
  - Orandi's
  - BMG
- Staged Urethroplasty
  - Johansson's

**Q: what is Jordan's flap?**

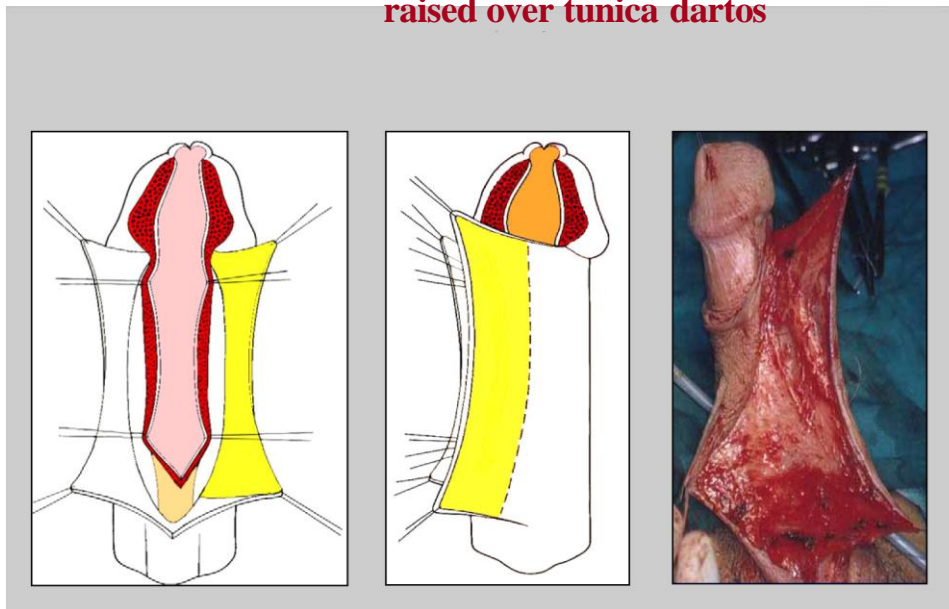
A: longitudinal vertical penile skin onlay flap

- Shape –long rectangular
- Alignment –vertical
- Donor site –penile shaft skin
- Blood supply-tunica dartos
- Fixation with urethra- onlay ventral in longitudinal axis (coffin lid type alignment)

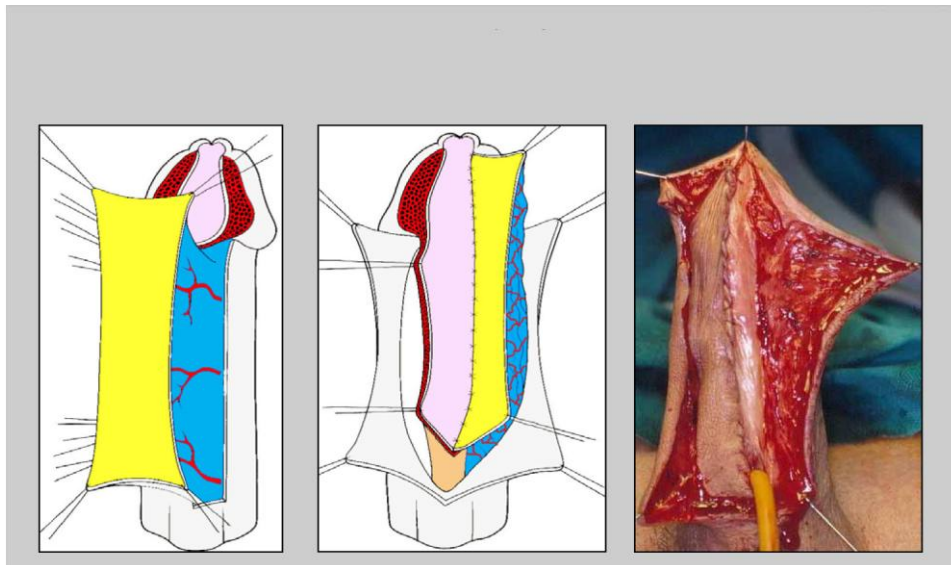
**Jordan's flap –donor site penile shaft skin**



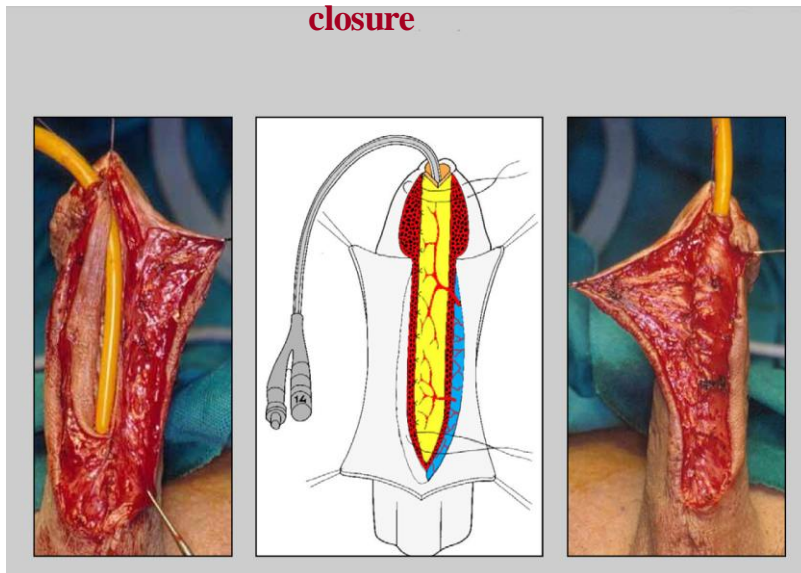
**Jordan's long rectangular flap raised over tunica dartos**



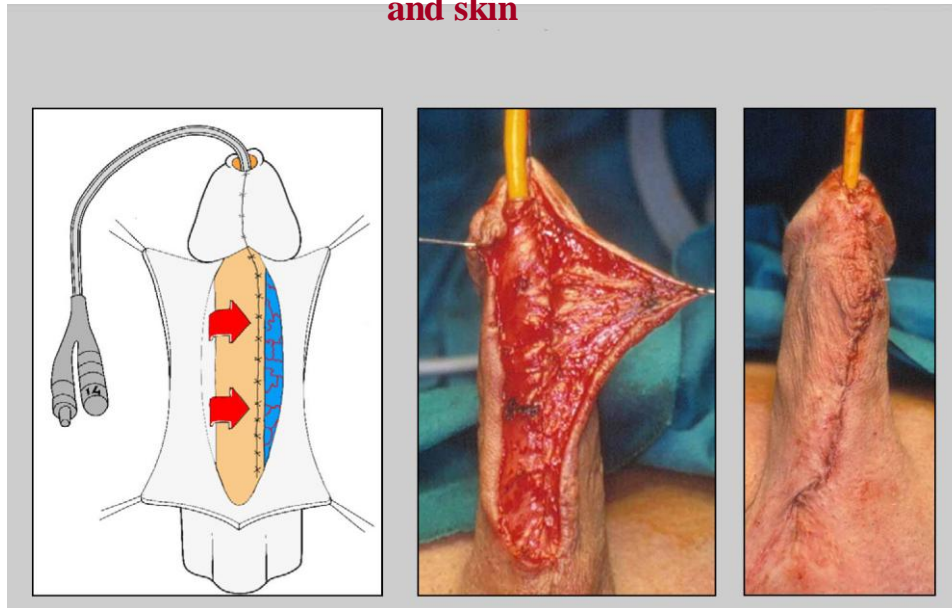
**Jordan's flap inverted over urethra**



**Jordan's flap –coffin lid type closure**



**Jordan's flap-2<sup>nd</sup> layer closure  
and skin**



**Q: what is Duckett's TPIF?**

**A:** Transverse inner prepuce onlay flap

- Shape – rectangular
- Alignment –horizontal at donor site
- Donor site – inner prepuce skin
- Blood supply-tunica dartos
- Fixation with urethra- onlay ventral in longitudinal axis after rotating 90°

**Q: which operation is very similar to Duckett's TPF?**

**A:** ASOPA TECHNIQUE for Hypospadias

Asopa technique uses full thickness prepuce skin i.e. both inner and outer layers

Readers are requested to read --Asopa HS, Elhence EP, Atri SP, Bansal NK.

One stage correction of penile Hypospadias using a foreskin tube. A preliminary report.

Int Surg 1971; 55:435-40

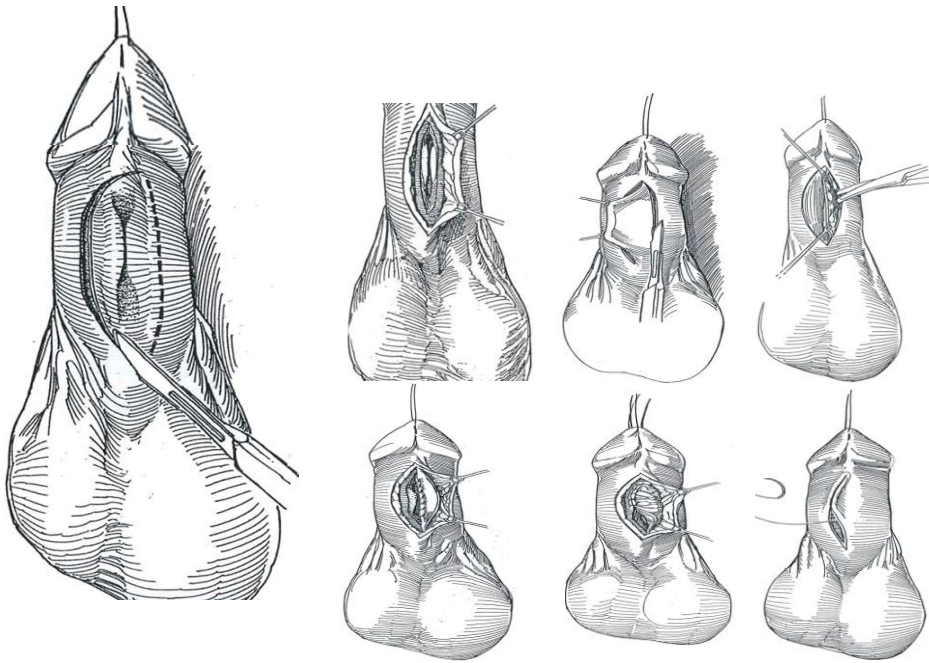
**Q: what is Orandi's flap?**

**A:** longitudinal island penile skin onlay flap

- Shape – ovoid
- Alignment – vertical at donor site
- Donor site – penile shaft skin
- Blood supply-tunica dartos

- Fixation with urethra- onlay ventral in longitudinal axis after rotating on long axis

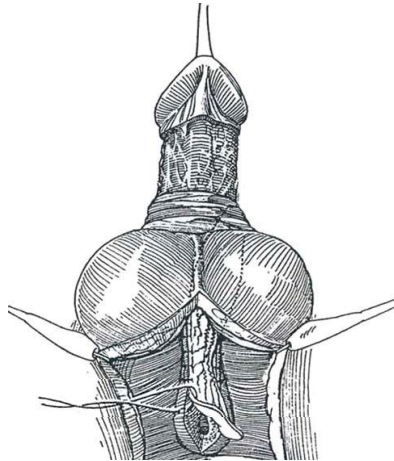
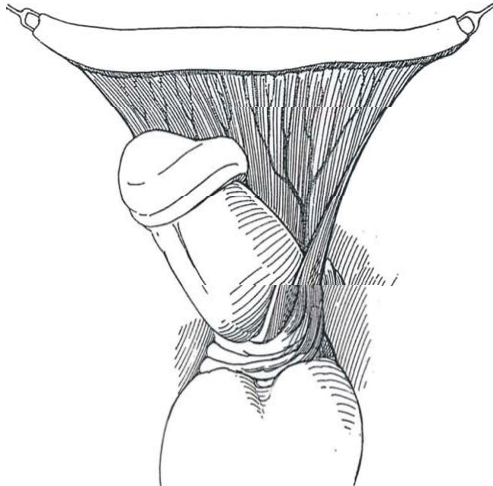
## LONGITUDINAL ISLAND FLAP (Orandi)



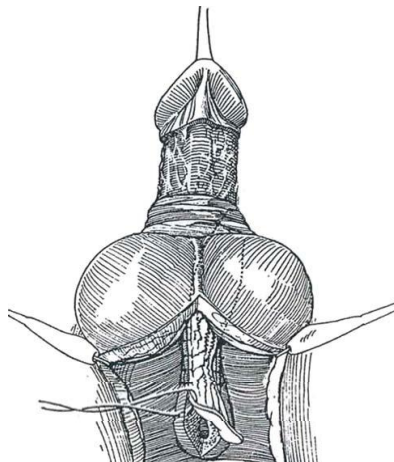
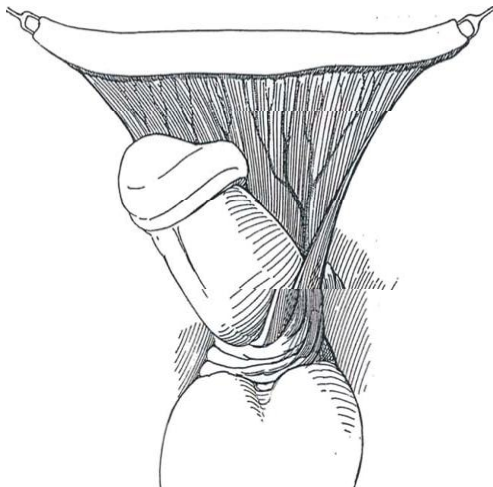
**Q: what is Mc Annich flap?**

**A: complete circumferential flap**

**PREPUTIAL ISLAND FASCIOCUTANEOUS FLAP  
(McAninch**



**PREPUTIAL ISLAND FASCIOCUTANEOUS FLAP  
(McAninch**



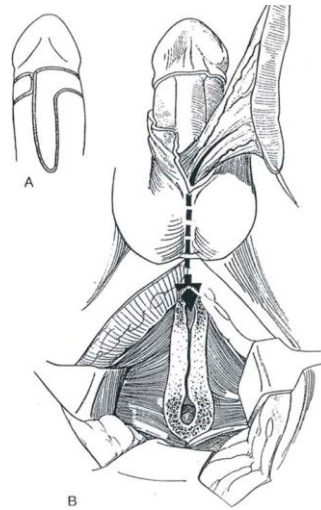


**Q: what is Q FLAP?**

A: Circular penile skin island flap mobilized on dartos fascia. Circular strip is opened /cut dorsally, it has a vertical limb also.

**LONGITUDINAL + TRANSVERSE PREPUTIAL ISLAND FLAP (Quarthey)**

- The Quarthey flap combines the Orandi procedure with that of McAninch
- Although it is an older procedure, because it provides a large island it is useful for extensive defects in the perineal portion of the urethra



**Q: what are the compl<sup>n</sup> of penile skin flaps?**

A:

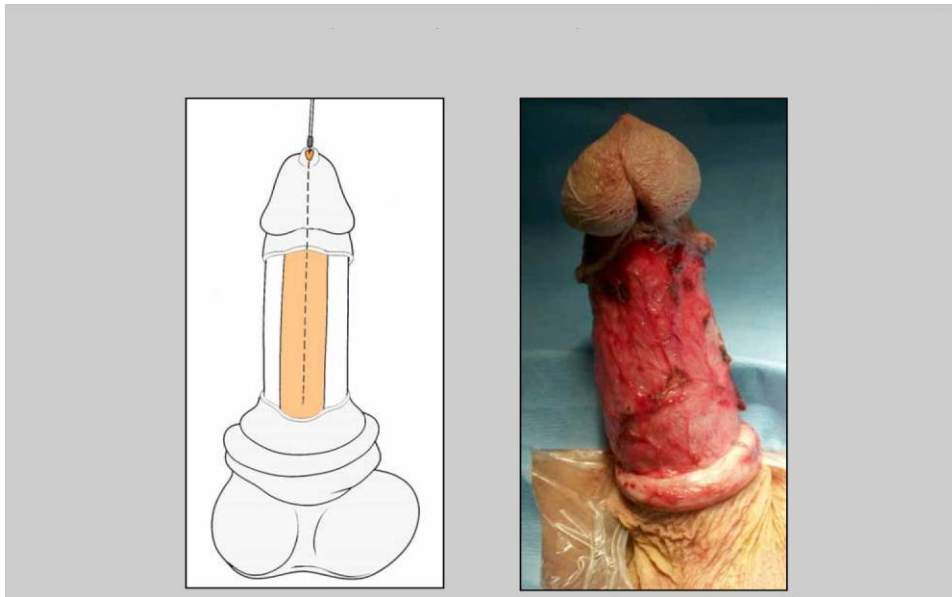
1. Loss of penile skin
2. Penile skin necrosis
3. Disturbed penile sensation
4. Pain of bending on erection
5. Not suitable for BXO
6. Hair growth in urethra

**Q: what is ASOPA's technique for long anterior penile stricture?**

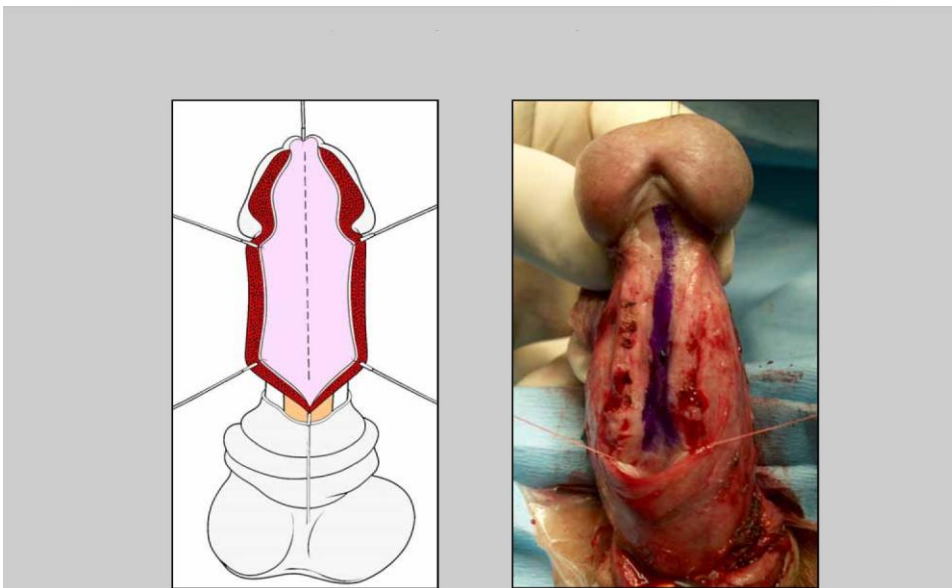
A: dorsal inlay BMG urethoplasty

- Shape – ovoid with acute 'V' at angles
- Donor site – buccal mucosa
- Blood supply-free graft
- Fixation with urethra- inlay dorsal after doing ventral urethrotomy in longitudinal axis

● **Asopa's technique**

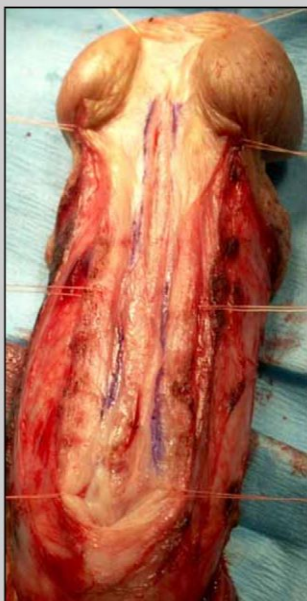
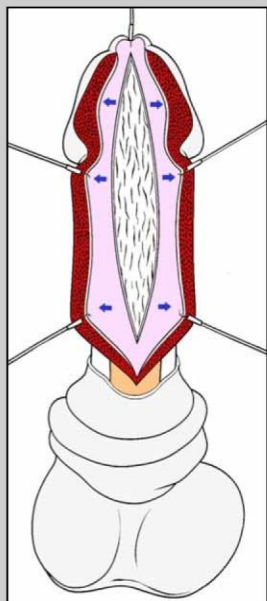


● **Asopa's technique**

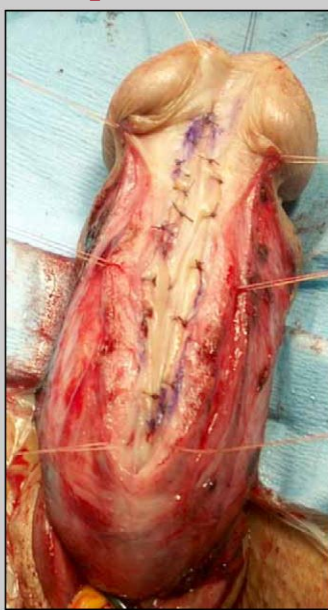
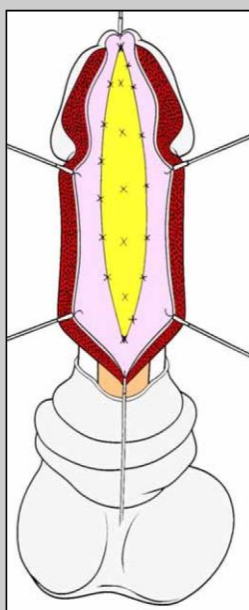




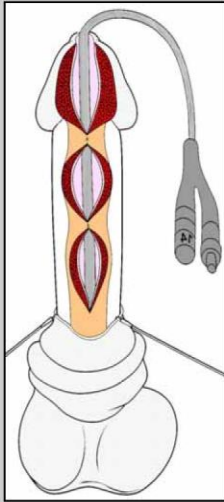
● **Asopa's technique**



● **Asopa's technique**



● **Asopa's technique**



Please read--

**Dorsal onlay (barbagli technique) versus dorsal inlay (Asopa technique) buccal mucosal graft urethroplasty for anterior urethral stricture: a prospective randomized study**  
**PMID: 23931150**

**Two stage Reconstructions**

**Q: what are the famous two stages Reconstructions?**

**A:** Brakka's Op<sup>n</sup> ,  
Johansson's operation

**Q; what is Brakka's Op<sup>n</sup>?**

**A;** Two Stages BMG

**Ind<sup>n</sup>:** Where urethral plate is absent/severely scarred

**Stage I:** excise urethral plate & paste BMG + perineal uretheroplasty,

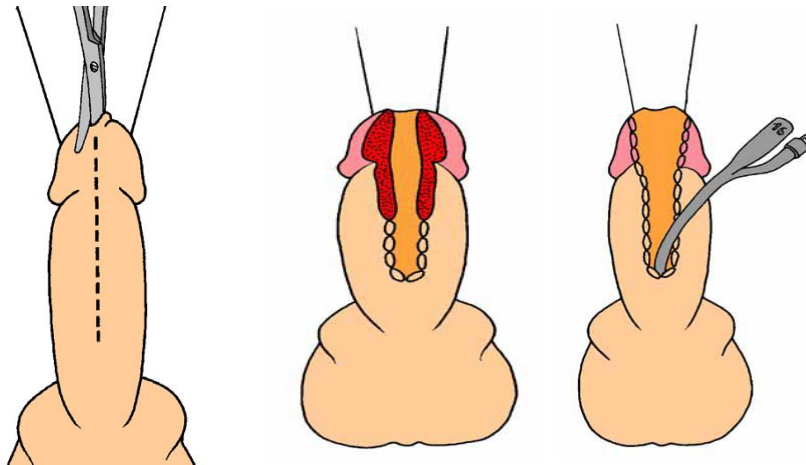
**Stage II (after 6 months) :** Tubularize the plate into neourethra

**Q; what is Johansson's Op<sup>n</sup>?**

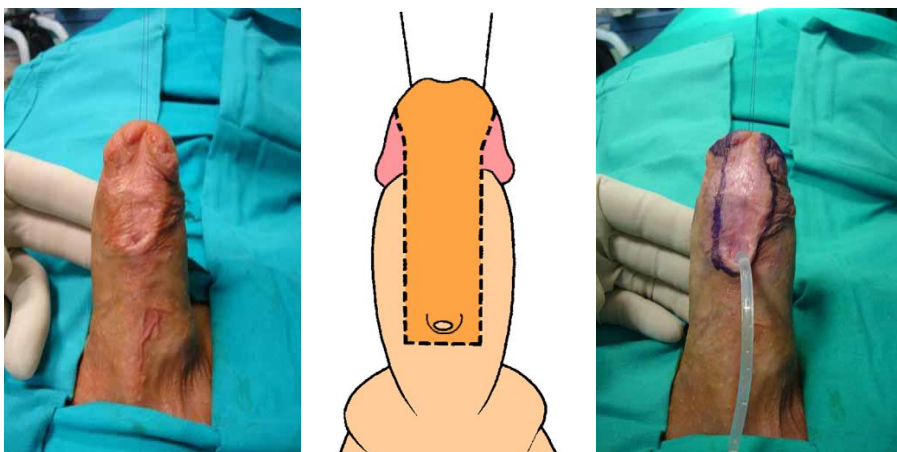
**A;** Stage I: lay open urethra → meshed skin graft lateral to urethral plate

**Stage II: (after 6 months);** Tubularize the plate

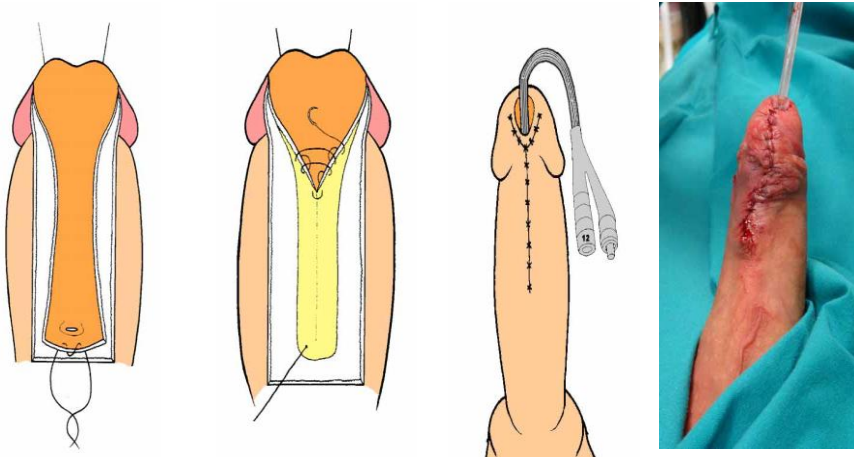
## First stage



## Second stage



## **Two-stage urethroplasty complete with intervening 2<sup>nd</sup> layer**



**Q: what is Bangkok flap?**

**A:**

- Stage 1 : Denude the anterior scrotum (for anterior urethral stricture), and paste BMG on denuded scrotal area
- Stage 2: (after 6 months) : Excise the scrotal skin with BMG (as flap) ; rotate it to cover urethra
- Use posterior scrotum for post urethral defects

**Q: what are the Ind<sup>n</sup>. For two stage BMG?**

**A:**

- Excision of larger urethral tumours
- Grossly infected strictures / scarring
- Amyloid disease
- Vascular malformations of urethra
- After excision of Urolume stent

**Q: How can you repair pan-urethral stricture?**

**A:** Johansson's two stage opn

Brakka two stages opn

One stage ventral onlay 'Q' flap / Mc Annich flap

**Q: How will you do dressing of these patients?**

**A:** for urethral neoplasia operation, three layer dressing –

1. Ointment gauze,
  2. Balled Compression,
  3. Dynaplast 'X' shaped bandage to perineum.
- Penis strapped to abd

---

**Distal urethral strictures and Meatal STENOSIS**

**Q: what are the causes for distal anterior urethral stricture?**

A: Iatrogenic /BXO/ Idiopathic/ Ammonical urethritis /Gonococcal / injury

**Q: What are the causes of meatal stenosis?**

A:

Adult

- TUR (Trans urethral instrumentation)
- BXO
- Post Hypospadias Sx

Infant –Post circumcision

- Ammonical meatitis

**Q: what is the medical Rx of infant meatal Stenosis?**

A: 0.05% clobetasol cream

**Q: what are the surgical options for meatal stenosis?**

A:

1. Ventral Urethral meatotomy (6 o clock) – fl/ by regular meatal dilation
2. Y-V plasty
3. Blandy's vertical flap
4. Cohnsey's horizontal flap
5. Jordan's flap
6. Devine & Horton's operation
7. Buccal mucosal grafting
8. Endoscopic meatoplasty

**Ventral Urethral meatotomy**

**Q: why is there need of meatotomy when meatal dilatation can be done easily?**

A: Serial dilatation results in small tears of the meatus, which are followed by secondary healing. In the long term, this creates a tighter stricture at the tip of the penis; therefore, this procedure is discouraged and meatotomy is needed.

**Indication: meatal stricture with normal rest of the urethra**

**Anaesthesia: regional anaesthesia /spinal / short G.A.**

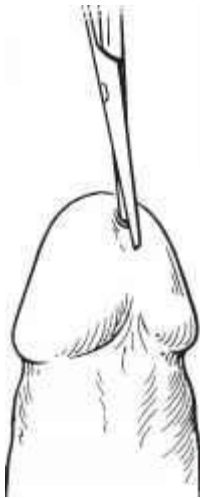
**Procedure:**

Meatotomy is a simple procedure in which the ventrum of the meatus is crushed (for hemostasis) for 60 seconds with a straight mosquito hemostat and then divided with fine-tipped scissors.

- the penis is prepared and draped into a sterile field.
- Throughout this procedure, reassure the child and tell him what is being done.
- Introduce one blade of a straight mosquito hemostat into the meatus and crush the ventrum of the meatus (approximately 3 mm) by closing the hemostat. This provides adequate hemostasis in most cases.
- Divide the crushed area with a straight fine-tipped scissor and apply an antibiotic ointment.
- After the operation, it is critical that the caregivers separate the edges of the meatus and apply antibiotic ointment or petroleum jelly twice a day for 2 weeks and then once a day for another 2 weeks to prevent one side of the meatotomy from adhering to the other side.
- Some urologists recommend dilation with a lubricated feeding tube or the tip of an ophthalmic ointment tube for a period of 4-8 weeks.
- Mild dysuria may be present for 1-2 days after meatotomy. If dysuria results in urinary retention, placing the child in a tub of warm water may stimulate micturition.

**Post op advice**

- After meatotomy, instruct caregivers to dress the child in loose underwear for 24 hours.
- Restrict activities, such as contact sports, bicycle rides, and playground activities, for 3-4 days.



**Q: what are the disadvantages of ventral meatotomy?**

**A:**

- Hypospadiac appearance of meatus
- Bleeding, infection
- Re-joining of cut open meatal edges
- Need for regular dilatation for 1 month

**Q; what is Y-V meatoplasty?**

A: a Y shaped incision is made with two small limbs of Y circumventing the urethral meatus and long limb of Y at 6 o'clock upto the normal urethral mucosa. This incision is then closed in 'V' shape taking sutures between urethral mucosa and glans skin.

---

**meatoplasty**

**Q: what is meatoplasty?**

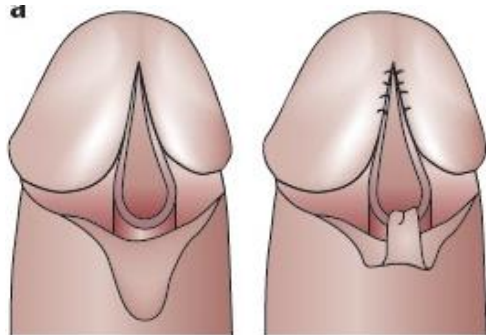
**A: The surgical technique of "Meatoplasty" is made by opening the meatus, widening the urethral lumen by applying a skin or oral graft. There are three basic types of Meatoplasty**

- **Meatoplasty using skin flap.** Using this technique, the urethral meatus is augmented using a penile skin flap e.g. BLANDY's meatoplasty , Cohnen's meatoplasty and Jordan's meatoplasty
- **Meatoplasty with oral mucosal graft.** Using this technique, the urethral meatus is augmented by a transplant of an oral graft .
- **Meatoplasty with skin graft.** Using this technique, the urethral meatus is augmented by a transplant of a skin graft.

**Q: what is Blandy's Meatoplasty?**

**A:**

- Do a 6 o clock meatotomy
- Cut the glans with scissors upto normal urethra
- Raise a vertical flap of skin with free end towards glans
- Fix the tip of flap to the proximal part of cut open urethra
- Keep closing the edges with skin flap so that skin flap inverts into urethra



**Q: what are the disadvantages of Blandy's op<sup>n</sup>?**

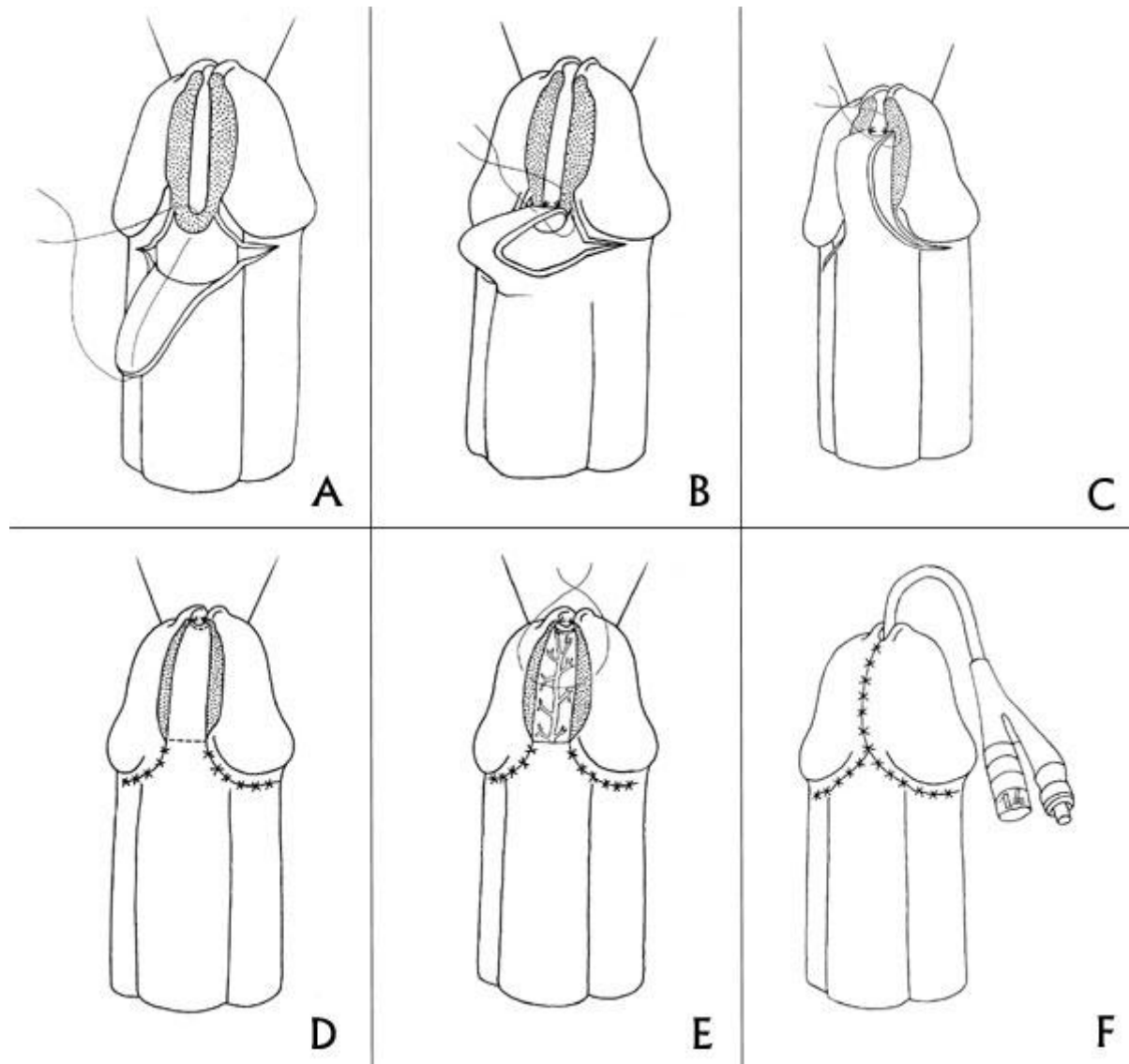
**A:**

- Hypospadiac meatus
- Cosmetic –ill- appearance

**Q: what is modified Blandy's operation?**

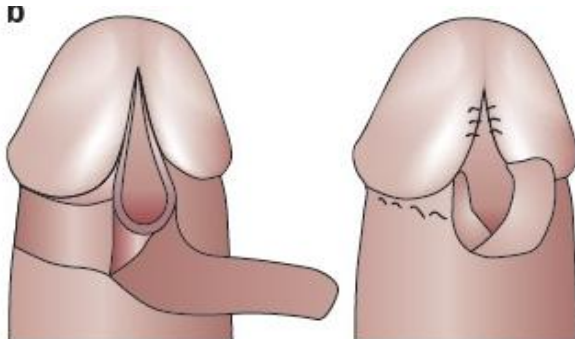
A: glans wings are raised in the initial step and then penile skin flap inverted and sutured to urethral margins. Glans wings are closed over this skin flap resulting in a cosmetically better appearance.





**Q: what is Cohney's Meatoplasty?**

**A:** it is a Horizontal skin flap raised (rather than Blandy's vertical flap) and then rotated 90°.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is the status of Cohnsey's or Blandy's meatoplasty?**

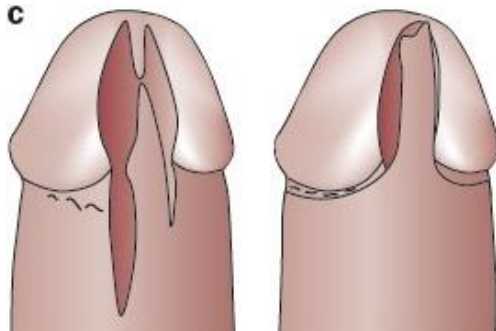
**A:**

- Not preferred due to poor cosmesis,
- can be used in old/elderly persons
- However modified Blandy's and modified Cohnsey's can be done.
- Both the above operations cannot be done for BXO strictures

**Q: what is De-Sy's op<sup>n</sup>?**

**A:**

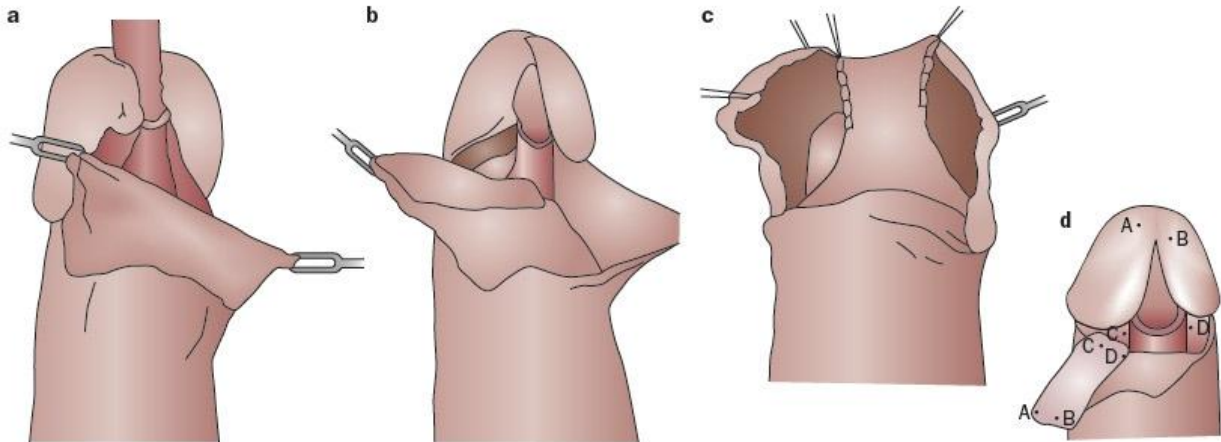
- Lay open the glans & meatus
- skin island flap over dartos to cover from old meatus to upto new meatus
- Suture the skin flap with urethral margins over foleys catheter
- Close the glans again



**Q: what is Jordan's repair?**

**A:** Distal Penile – Transverse – Ventral fascio-cutaneous island flap

- a) Glans wings are raised and urethra dissected
- b) A penile skin rectangular flap is raised over tunica dartos
- c) Rest of the penile skin closed
- d) Rectangular skin flap is inverted over the laid open urethra and sutured
- e) Glans wings closed over it.



**Q: What is the drop-back of Jordan's repair?**

**A:**

- Poor results in BXO;
- In all other strictures it has excellent results

**Q: What is the dis-adv of Jordan's op<sup>n</sup>?**

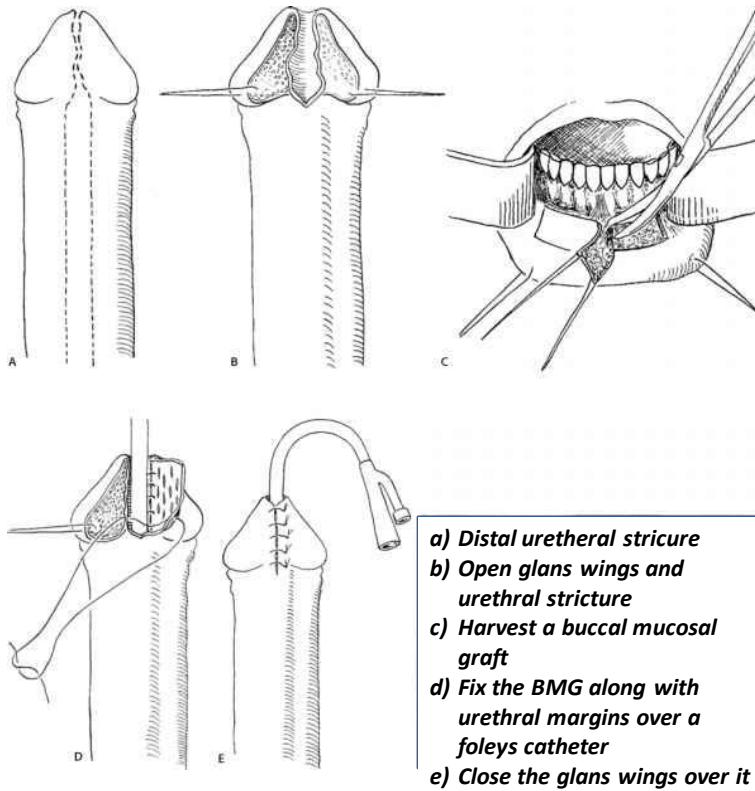
**A:** Cannot be used in BXO; BXO is most common cause of meatal stenosis

**Q: what is Devine Horton Op<sup>n</sup>?**

**A:** Excise the strictured fossa navicularis & do urethral pull through.

**Q: what will you do BXO-Meatal stenosis?**

**A:** Buccal mucosal graft fixed over urethral stricture as inlay or onlay .



**Q: what is endoscopic meatoplasty?**

**A;**

- Uretheroscopy – incise the fibrous area using cold knife
- Mark the distance with Cystoscope
- Get a SSG/ BMG
- Fix SSG/BMG Over Foleys Corresponding to Cystoscope
- Deploy Foleys with SSG/ BMG ,
- deploy SPC.

**Pan urethral stricture and staged Uretheroplasties**

**Q: what is etiology of a complex stricture?**

- A Iatrogenic – long term catheterization
- Traumatic insertion of Cystoscope
  - Resectoscope, post TURP

Long term Catheterization:

- Pent up secretions
  - Pressure necrosis
- } Urethritis

**Q: What will you do for Pan urethral stricture?**

A: ideally two stage repair ....

- BRAKKA's op<sup>n</sup>
- Johansson's op<sup>n</sup>

Or one stage repair can be done.

**Q: what one stage urethoplasty can you do?**

A

- Dorsal onlay using Mc Annich flap or Quartey flap.
- Long ASOPA technique(BMG inlay)
- BMG onlay

**Q: how will you do BMG ONLAY?**

A:

1. Incise the anterior urethra (vertically) from meatus to 1.5 cm proximal to stricture
2. Put a silicon catheter
3. Sew a onlay BMU graft over ventral aspect
4. Cover the neo urethra with vascular layer corpus spongiosum
5. Close the glans & penile shaft
6. Cover the penile skin

**Q: what is the most common flap op<sup>n</sup> for pan urethral Strictures?**

A: Mc'Annich flap (circular fascio-cutaneous penile skin flap)

'Q' flap is a modification of Mc'Annich flap b'coz it carries an additional midline ventral longitudinal penile extension

**Q: what are the complications of Q flap / mc' annich flap op<sup>n</sup>?**

A: necrosis of penile skin @ donor site

If flap >2 cm wide – urethral diverticulum

**Q: what other flaps can be used?**

A; Biaxial scrotal flap (from peno- scrotal junction to Perineo scrotal junction 2 cm wide skin flap is elevated), (needs prior multiple epilators sessions)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is classical 2 stage repair?**

A: Johansson's op<sup>n</sup>

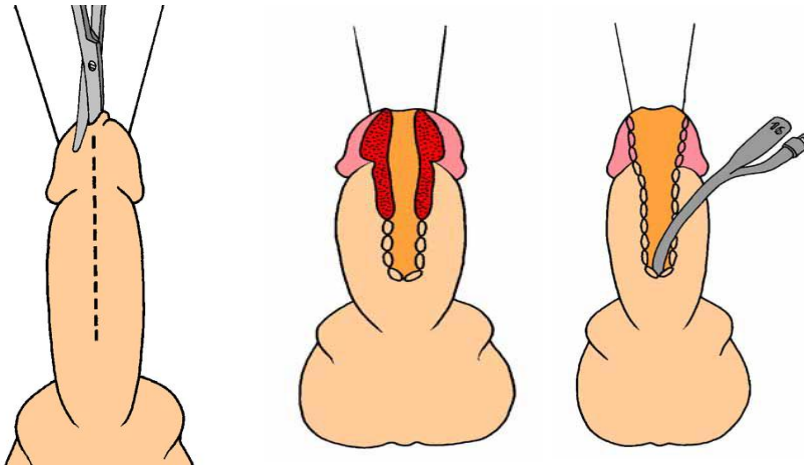
1<sup>st</sup> stage – marsupilization of urethra

2<sup>nd</sup> stage – reconstructive tubularization repair over foleys catheter

**Q: what will you do in 1<sup>st</sup> stage Johansson's op<sup>n</sup>?**

- Lay open penile shaft & urethra
- Put meshed graft b/w lateral margins of urethral plate and free ends of penile shaft skin

### **First stage**



**Q: what is now used as graft?**

A: meshed graft of non hairy skin

**Q: what is the interval b/w two stages?**

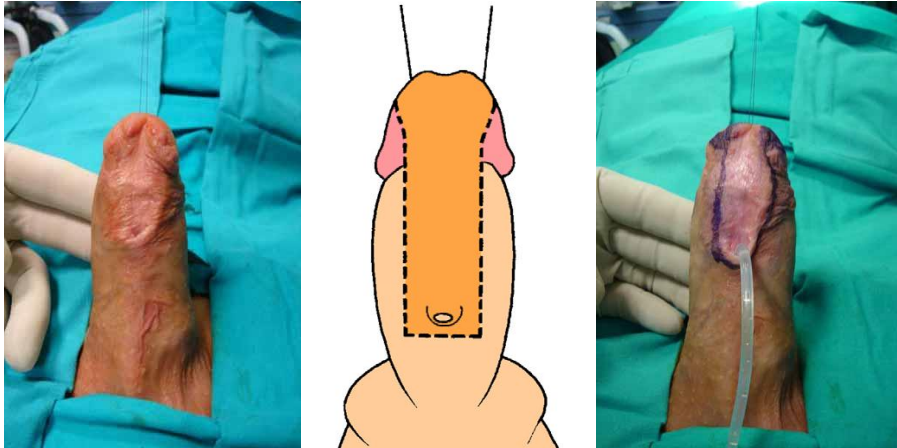
A: min 8-12 wks usually 4-6 months

**Q: What is 2<sup>nd</sup> stage of Johansson's?**

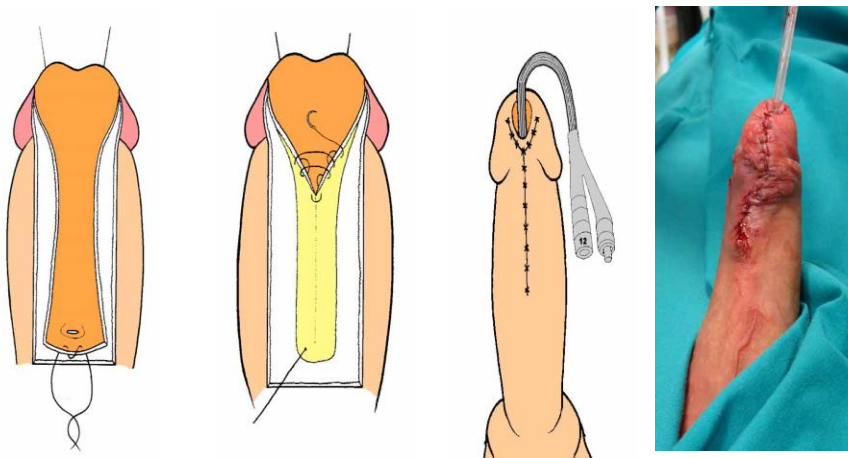
A

- Re tubularization over 24 f Foleys / silicon
- Cover the penile shaft with skin

## Second stage



## Two-stage urethroplasty complete with intervening 2<sup>nd</sup> layer



**Q: what is the drop back of Johansson's repair?**

A: -as skin is used for repair, Johansson's repair is not suited for BXO stricture disease.

- Unavailability of non hairy skin poses a problem.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what can be done for non availability of non-hairy skin?**

A:

- Multiple epilations
- Laser treatment of skin hairs

**Q: When will you augment Johansson (J-1)( stage -1) with BMG?**

A: When it is felt that urethral plate width size is < 30 mm for tubularization either a meshed skin graft or a strip of BMG can be fixed.

**Q : why 30 mm width is required ?**

A : 30 mm width means a urethral size of 30 fch but due to graft shrinking, wastage due to edges necrosis and utilization during suturing ,final urethral size becomes around 24 fch.

**Q: what will you do when urethral base plate width is found to be 20 mm at the time of Johansson 2 (and augmentation is not done at the time of stage 1) ?**

A: BMG dorsal onlay

Or

Put BMG –now and wait for 6 months and later do Johansson's stage -3.

**Q: What is the time interval b/w J-I, & J-II op<sup>n</sup>?**

A: assess pt at 5<sup>th</sup> month and if urethral plate is healthy, do Johansson's stage -2 at 6th month .

**Q: what are the Ind<sup>n</sup>. For two stage BMG?**

A:

- Grossly infected strictures / scarring
- Excision of larger urethral tumours
- Amyloid disease
- Vascular malformations of urethra
- After excision of Urolume stent

**Q; what is Brakka's Op<sup>n</sup>?**

A; Two Stage BMG

Ind<sup>n</sup>: Where urethral plate is absent/severely scarred

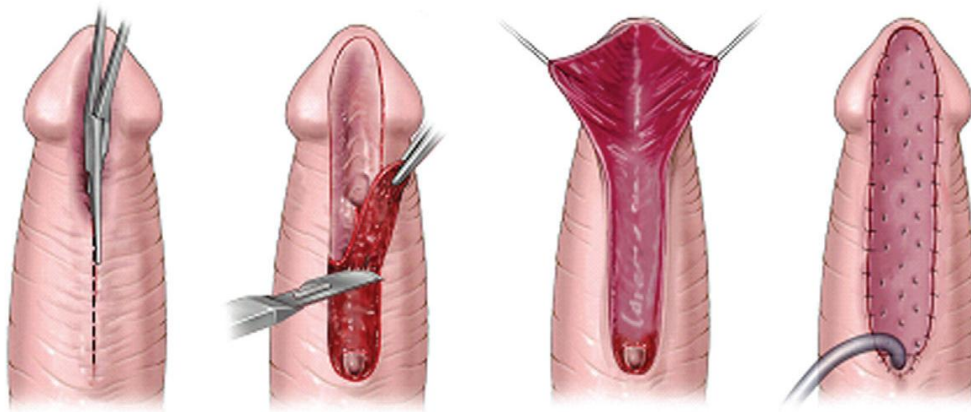
Stage I: excise urethral plate & paste BMG + perineal urethoplasty,

Stage II (after 6 months): Tubularize the plate into neourethra



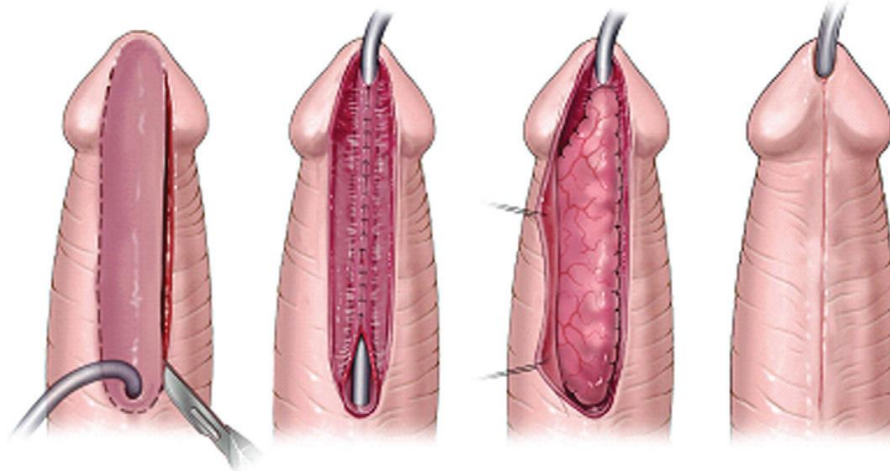
**STAGE -1**

- a) Lay open the urethra
- b) Excise the scarred urethral plate
- c) Refreshen the urethral bed
- d) Fix the buccal mucosal graft



**Stage -2--- (after 6 months)**

- a) 'U' shaped incision around BMG plate
- b) Tubularization over foleys catheter
- c) Intervening 2<sup>nd</sup> layer
- d) Final skin closure



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is Byar's flap?**

A: when penile shaft skin is dorsally incised and wrapped around for covering the re-tubularized neo urethra

**Q: what will you do for complex stricture involving entire length of urethra?**

A:

- Split the scrotum also and lay open the whole urethra; scrotum is hitched above testicles & split skin grafting done
- In 2<sup>nd</sup> stage re-Tubularize the graft

**Q: where else can you use mesh graft urethoplasty?**

A: Hypospadias cripple

**Q: How will you do dressing of this pt?**

A: Three layer dressing with 'X' dynaplast

**Q: what is the site for recurrence of stricture after flap?**

A: Proximal & distal anastomosis, usually a repeat VIU is sufficient for short recurrences

**Q: In what condition will you do staged op<sup>n</sup>?**

A: extensive scarring, fistula, inf<sup>n</sup>, graft factors,

Single stage reconstruction is done if stricture caliber is more than 6Fch, otherwise do two staged op<sup>n</sup>

**Q: What is the final bail out methods for urethral strictures?**

A: Perineal urethoplasty / Urethrostomy / lay open stage (side to side anastomosis), SPC.



***Neeraj Sharma's-***  
**NOTES FOR UROLOGY PRACTICALS**

***PFUDD***

**Chapter editor...**

**Dr Shivshankar**  
**Royapettah medical college, Chennai**

**PFUDD**

**Q: what is PFUDD?**

A: Pelvic fracture urethral distraction defect (PFUDD)

**Q: why posterior urethral strictures are known as defects?**

A: Following a pelvic bone fracture with the destruction of posterior urethral continuity, a surrounding hematoma-fibrosis complex is formed between the two urethral ends. Therefore, instead of "stricture," the term of "defect" is usually used for the posterior urethra

**Q: What is the m/c cause of PFUDD?**

A:

- Vehicular accidents
- Falls
- Industrial accidents

---

***Pelvic fractures #***

**Q: which pelvic fractures are associated with PFUDD?**

A:

- Fracture of anterior pelvic ring
- Pubic diastasis
- Straddle fracture
- # resulting in both vertical & rotational pelvic instability

**Q: what % of pelvic # will have urethral injuries?**

A: 10%

**Q: When can Pubic diastasis occur naturally?**

A: In female – Pregnancy

In male → never

**Q: How are pelvic fractures classified?**

A:

- Tile's classification system based on stability of pelvic rim
- Young's classification based on type of compression causing pelvic fracture.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is Tile's Classification System?**

**A:** The Tile classification system is based on the integrity of the posterior sacroiliac complex. Tile classification

- Type A-- stable
- Type B – rotationally unstable, vertically stable
- Type C – rotationally and vertically unstable

In type A injuries, the sacroiliac complex is intact. The pelvic ring has a stable fracture that can be managed nonoperatively.

Type B injuries are caused by either external or internal rotational forces resulting in partial disruption of the posterior sacroiliac complex. These are often unstable.

Type C injuries are characterized by complete disruption of the posterior sacroiliac complex and are both rotationally and vertically unstable. These injuries are the result of great force, usually from a motor vehicle crash, fall from a height, or severe compression.

### **Q: what is Young's classification of pelvic fracture?**

**A:** Young-Burgess Classification

- Anterior Posterior Compression (APC)
- Lateral Compression (LC)
- Vertical Shear (VS)

### **Q: what is open book fracture?**

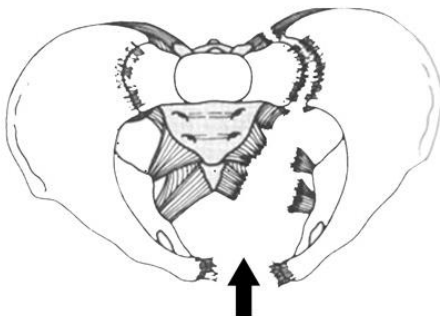
**A:** Caused by A-P Compression (type II)

Diastasis of pubic symphysis

+

Disruption of ipsilateral S.I. Joint

} = open Book #



## Neeraj Sharma's ...Notes For Urology Practicals

**Q: What is Malgaigne's #?**

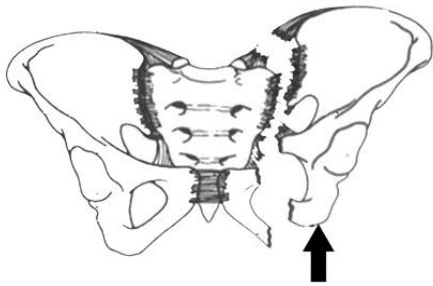
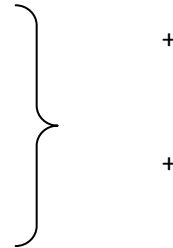
A: Vertical Shear #

Ipsilateral # of both Pubic rami → superior & inferior

= Malgaigne's #

Ipsilateral # of S.I joint

Vertically two different levels of hemi pelvis



**Q: what is Butterfly #?**

A: also known as Straddle #

A.P compression injury

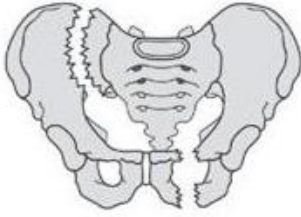
Involves the # of bilateral superior & inferior pubic rami with x shaped pubic symphysis intact.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is Bucket handle #?**

A: # of anterior arch & contralateral posterior arch



**Q: When will you guess that posterior urethral injury is there in a pt of pelvic #?**

A: If there is pubic diastasis

If there is infro-medial pubic rami fracture.

---

### **Pathophysiology of APUI**

**Q: what is the level of urethral injury in PFUDD?**

A:

- Classical Theory: Prostatic-Membranous junction is the level of urethral injury in PFUDD
- Revised theory: Bulbo- Membranous junction is the level of urethral injury in PFUDD

**Q: can APU I occur in females also?**

A: 5%, usually involving anterior wall of urethra along with vaginal laceration

Signs of urethral injury in females include:

- Vaginal bleeding or laceration (80%).
- Urethral bleeding.
- Haematuria.
- Labial swelling.
- Inability to void.

**Q: What is the level of Acute posterior urethral injury (APU I) in children?**

A;

- APUI Involves Bladder neck & Prostatic Urethra in children.
- PFUDD extend into Bldr neck because there is no prostate

**Q: What are the concerns with PFUDD?**

A:

- Bladder neck tear
- Incontinence
- Impotence



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what ligament injury is responsible?**

A: Pubo prostatic / pubo urethral ligaments

---

### **Clinical presentation**

**Q: What is the classical triad of urethral injury?**

A: The classical triad of posterior urethral injury in males includes:

- Blood at the urethral meatus.
- Inability to void (or distended bladder).
- Pelvic fracture with pelvic haematoma.

Amongst these signs, the presence of blood at the urethral meatus is the most important .

**Q: What will you see on DRE?**

A: High riding prostate (status of this sign is unreliable)

Rule out any rectal injury

**Q: What will you see in perineal region?**

A: Butterfly shaped perineal Hematoma

**Q: What is “pie in the sky” bladder?**

A: When Bladder is pushed high up due to pelvic hematoma

**Q: What is “pie in the sky” prostate?**

A; When prostate is pulled high up due to detachment of Pubo prostatic ligaments in posterior urethral injuries

**Q: What is the special Characteristic of female PFUDD?**

A –

- May extend into Bldr neck
- Vulval hematoma
- Immediate Repair of all injuries

**Q: How will you manage PFUDD in female?**

A: Immediate repair (or atleast catheterization) because female urethra is short and if gets trapped into scar, later it is difficult to mobilize, so immediate repair of urethra with concomitant repair of vaginal injury.

**Q: what is the basic investigation?**

A: Retrograde Urethrogram

**Q: how will you investigate in posterior Urethral injuries APUI in male?**

A: do gravity RGU and place a SPC (safe option and gold standard.)

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you classify posterior urethral injuries?**

A:

1. Colapinto and McCallum grading.
2. The American Association for Surgery and Trauma (AAST) grading

**Q: what is Colapinto and McCallum grading of posterior urethral injuries?**

A: Colapinto and McCallum grading.

Colapinto and McCallum grading emphasizes on the location of the injury in relation to the urogenital diaphragm in retrograde urethrogram. The original system described three types of urethral injuries.

- Type I—Urethral stretch injury
- Type II—Urethral disruption above / proximal to genitourinary diaphragm
- Type III—Urethral disruption both proximal and distal (both above and below) to urogenital diaphragm.

**Goldman et al later revised this classification and added two more types of urethral injuries.**

- Type IV—Bladder base injuries
- Type V—Straddle anterior urethral injuries.

Injury Type	Injury Description	Urethrographic Appearance
I	Stretching or elongation of the otherwise intact posterior urethra	Intact but stretched urethra
II	Urethral disruption above the urogenital diaphragm while the membranous segment remains intact	Contrast agent extravasation above the urogenital diaphragm only
III	Disruption of the membranous urethra, extending below the urogenital diaphragm and involving the anterior urethra	Contrast agent extravasation below the urogenital diaphragm, possibly extending to the pelvis or perineum; intact bladder neck
IV	Bladder neck injury extending into the proximal urethra	Extraperitoneal contrast agent extravasation; bladder neck disruption
IVa	Bladder base injury simulating a type IV injury	Periurethral contrast agent extravasation; bladder base disruption
V	Isolated anterior urethral injury	Contrast agent extravasation below the urogenital diaphragm, confined to the anterior urethra

**Q: what is AAST grading system?**

A: The American Association for Surgery and Trauma (AAST) grading:

The AAST grading emphasizes the degree of disruption and the degree of urethral separation. It divides urethral injuries into the following five types:

- Type I—Contusion
  - Type II—Stretch injury but no disruption of urethra
- Type III—Partial disruption of urethra
- Type IV—Complete disruption with urethral separation < 2 cm
- Type V—Complete disruption with urethral separation > 2 cm

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is Pansadaro's classification of posterior urethral strictures?**

A: Pansadaro's classification of posterior urethral strictures is provided here:

- Type I: Fibrous tissue involves the bladder neck only, termed "bladder neck contracture."
- Type II: Stricture is localized to the median part of the prostatic fossa, with open bladder neck and spared Verumontanum.
- Type III: Complete prostatic urethral obliteration.

Some people believe that Pansadaro's classification is for post TURP stricture.

### **Initial Management in acute injury**

#### **Q: what is the first and immediate management?**

A:

- deploy a supra pubic catheter nearly 5 cm above pubic symphysis in midline.
- Stabilize the patient
- Assess the other major injuries and their management

#### **Q: when will you do immediate primary repair?**

A: Main indications for primary repair are

- penetrating injuries like Gunshot injuries
- injuries of the bladder neck and prostate,
- injuries associated with perineal degloving and
- injuries associated with a rectal tear'

#### **Q: what is the ideal site of SPC insertion just post trauma ?**

A: 5 cm from pubic symphysis in midline

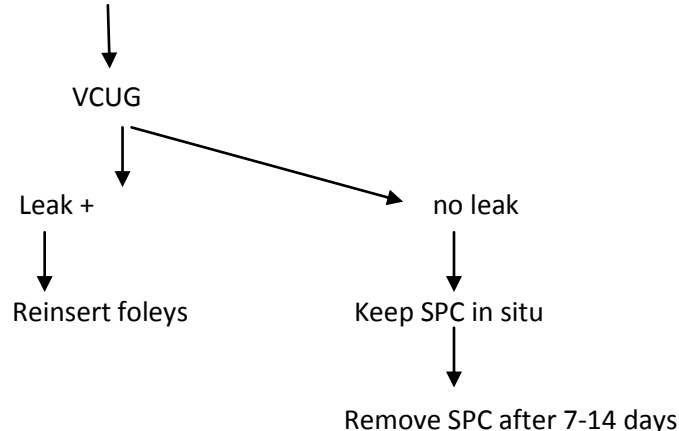
#### **Q: on which day will you do primary endoscopic re-alignment?**

A; 4<sup>th</sup> -6<sup>th</sup> day (when patient is stable) endoscopic / rail road re-alignment is done.

A silicon catheter is deployed.

#### **Q: when will you remove the per urethral Foley catheter after primary endoscopic re-alignment?**

A: after 4-6 weeks



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what would you do if it is a partial Tear?**

A: deploy a 14 FCH Foleys, gently at the initial single attempt, over a guide wire under IITV guidance

Exam answer .....I will deploy a SPC (safe and defendable answer)

### **Q: What are the adv of endoscopic primary realignment?**

A:

- Less callous
- Proper alignment

### **Q: How will you know it is partial /complete Tear?**

A: On AUG if some amount of contrast reaches bladder → Partial Tear

If no contrast reaches bladder → Complete Tear

### **Q: describe the procedure of dynamic ascending urethrogram (in a stable patient)?**

A: For urethrography of male patients, the external meatus is prepared in sterile fashion with the patient supine. Various devices may be used to instill the contrast agent: a specially designed clamp (eg, Knutsson or Brodney's), a 6–8-F Foley catheter with a 5-mL inflatable balloon, or a hysterosalpingographic catheter with a 3-mL balloon. When the catheter tip reaches the fossa navicularis, the balloon is inflated with 1–2 mL of saline solution. Anesthetic gel is not routinely used during catheter insertion because it increases the likelihood of catheter expulsion. Once the clamp or catheter has been inserted and the balloon is inflated, the fluoroscopic C-arm is rotated to a 30° left or right anterior oblique position or the patient is asked to elevate his left side to approximately the same angle. The oblique angle is essential to demonstrate the entirety of the urethra. For ascending urethrography, the penis is placed laterally over the thigh, and, while moderate traction is applied, 20–30 mL of an iodinated contrast agent is injected slowly via the catheter with fluoroscopic guidance. A slow rate of injection reduces the risk of extravasation. The injection should continue until the contrast material is seen to flow past the external urethral sphincter and into the bladder. Image acquisition should be initiated at this stage. Often, a spasm of the external sphincter prevents filling of the membranous and prostatic urethra. If this occurs, gentle continuous positive pressure should be applied with injection via the catheter until the sphincter relaxes.

### **Q: Describe the rail road technique?**

A: Instrument Davis male – female Bougie

Step

1. Open the Bladder
2. Female bougie from Bladder and male Bougie from urethra
3. Once engaged ; bring the joint bougies to bladder
4. Tie thread to male bougie
5. Out from urethra with thread
6. Tie Foleys to thread
7. Back to Bladder
8. Close Bladder +/- SPC
9. Thread Placed long over abdominal skin

**Q: When will you do delayed repair?**

A:

- after 3 months onwards
- Pt should be orthopedically fit & stabilized
- Pt should be well mobilized

**Q: what will you specially see in bed side examination during history taking?**

A:

- ask the patient to walk and squat or ask him to touch the knees to chest as much as possible
- See for high riding prostate in digital rectal examination.

**Q: How will you preoperatively evaluate the patient undergoing delayed Reconstruction?**

A:

- Do "up and down -o-gram"--.( Simultaneously VCUG + AUG)
- Do" Gapometry" – MRI

**Q what is Gapometry?**

A: Gapometry" – MRI is the calculation of urethral defect( gap) on MRI

Adv: Takes into consideration the bend of the urethra

**Q: What is Gapometry index?**

A:

$$G = \frac{\text{Gap (length of defect)}}{\text{Length of Bulbar urethra}}$$

Less than 0.35 is good,

In other words a gap which is  $\frac{1}{3}^{\text{rd}}$  of the total bulbar urethral length can be anastomosed directly, where as a gap of more than  $\frac{1}{3}^{\text{rd}}$  the bulbar length requires a progressive perineal urethoplasty.

**Q: What is the other name for Gapometry index?**

A: urethrometry index

**Q: what can you do if Bladder neck does not open while VCUG?**

A: Use flexible Cystoscopy

Try giving Silodosin 8 mg and repeat the study after 1 hr. (controversial answer some examiners do not agree for this statement.)

**Q: What is the need to take scout film in VCUG?**

A: To see for

- Calculus
- status of fracture healing
- Any bony fragment lying near posterior urethra.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what do you want to see in VCUG?**

A:

- Bladder Neck status open or close
- Diverticulae,
- stones (in bladder)
- Prostatic Urethra

**Q: What is S-Bend displacement?**

A: It is the posterior and sideways displacement of urethra due to callous/ hematoma.

S bend is best appreciated on reconstructed MRI images.

**Q: what is beaked bladder neck?**

A: on a static VCUG Cystogram, open bladder neck appearance is known as beaked bladder neck.

- It is quite common to see an apparently incompetent bladder neck in association with a complete obstruction but this is usually misleading. The reason for this appearance (of a so-called "beaked" bladder neck) is not clear, but the vast majority of such patients have a perfectly competent bladder neck postoperatively.
- When the bladder neck has been damaged, it produces an altogether different appearance; indeed, it looks as though it has been damaged rather than simply being beaked open.

**Q: What are the D/D for Bladder neck not opening on MCU?**

A:

1. Anxious patient
2. Bladder neck injury
3. Associated primary bladder neck obstruction
4. Radiolucent stone in urethra / Bldr neck
5. Fibrous callous

**Q: How will you then evaluate Bladder neck & post urethra ?**

A:

1. Repeat VCUG with Tab Siladosin 1 hr before procedure
2. Flexicystoscopy
3. Pass 5 Fch feeding tube across Bldr neck & inject contrast in post urethra

**Q: what are the options available for PFUDD delayed Mx?**

A: Endoscopic Mx

Open Sx

**Q: What is the status of endoscopic Mx?**

A: endoscopic management is not used as a part of delayed management.

Some authors have described endoscopic 'core through' the callus but results are not good.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What surgery is done for PFUDD?**

A: End to end repair anastomosis

**Q: what are the adjuvant maneuvers?**

A;

- Corporeal splitting
- Inferior pubectomy
- Urethral re-routing

**Q: What are the indications for combined abdomino-perineal approach?**

A:

- severe fibrosis
- Fistula
- Long defect
- Previous failed repair
- Bladder neck injury
- Pediatric cases

**Q: What are the complications of PFUDD Sx?**

A;

- Erectile dysfunctions
- Recurrent stenosis
- Incompetence

**Q: In which age group (pediatric or adults) urethoplasty has Better results?**

A: In adults, because, in children elasticity of urethra is less and length of bulbar urethra is more in adults

**Q: what is the major cause of erectile dysfunction in PFUDD?**

A: neurological is more common cause than vascular cause.

**Q: what is the status of cold clammy penis as marker of vascular insufficiency of penis?**

A: it is only in books, very rare to see practically.

**Q: How will you do penile revascularization?**

A: Anastomose inferior epigastric artery to dorsal penile artery.

**Q: describe the history of posterior urethral anastomosis operation?**

A:

- 1962 – Pierce –performed the “splendid” exposure of the posterior urethra by total abdominal pubectomy, but he later abandoned this approach because of postoperative problems and several failures.
- 1968 - Paine and Coombes - direct transpubic excision of the stricture associated with primary end-to-end anastomosis of the urethral ends, using a single abdominal incision.
- 1973 – Waterhouse - perineal incision for mobilization of the anterior urethra and an abdominal incision for transpubic anastomosis between the bulbar urethra and the prostatic apex.
- 1976 - Turner-Warwick omental wrap to provide vascular and trophic support to the transpubic bulboprostatic anastomosis.
- In the 1970s and into the 1980s, the perineal-abdominal transpubic urethroplasty was considered the gold standard in the majority of adults and children suffering from PFUDDs showing traumatic strictures that Turner-Warwick described as complex.
- In 1983, Webster and Raman popularized an elaborated perineal approach for the reconstruction of pelvic fracture related urethral distraction injury in which urethral mobilization is augmented by progressing through additional steps of corporal splitting, inferior pubectomy and supracrural urethral rerouting, as needed, to bridge long or complex urethral defect.

**Q: what is the exact timing for delayed repair?**

A:

- atleast 3 months from the day of injury
- Patient mobility
- Patient should be able to achieve extended lithotomy position

**Q: what are the repairs you know for PFUDD?**

A:

- Webster’s progressive perineal urethteroplasty PPUx
- Waterhouse’s abdominal urethteroplasty

---

**Webster’s progressive perineal urethteroplasty PPUx**

**Q: what do you mean by progressive perineal urethteroplasty PPUx?**

A:

- Most posterior urethral distraction defects are short and usually resolved by a perineal approach anastomotic repair.
- However, a ‘perineal progressive approach’ is required when the Prostato-bulbar gap is longer than 2–3 cm due to a high dislocation of the prostate or when the mobilized urethra is too short because of damage during a previous surgical procedure.
- The progressive approach involves a series of maneuvers to produce sufficient anterior urethral mobility to bridge up to 8 cm of separation



**Q: what are the progressive steps in progressive perineal urethoplasty PPUx ?**

**A:** the progressive steps are

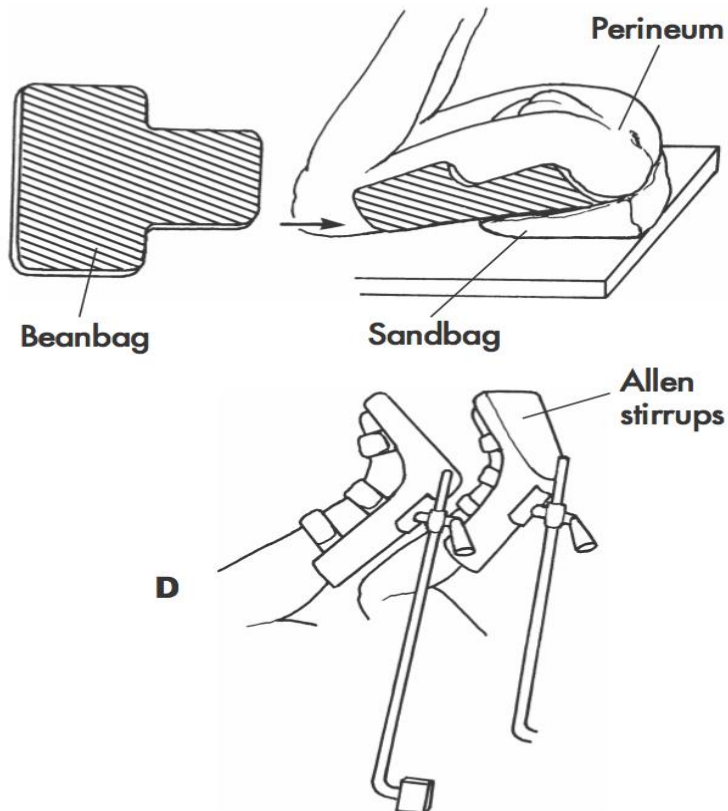
1. Complete bulbar urethral mobilization
2. corporal separation
3. inferior pubectomy
4. rerouting of urethra around the corpora cavernosa

**Q: what are the accessories used for patient positioning for PPUx?**

**A:**

1. Allen stirrups
2. Sand bag or a rolled towel
3. Bean bag (optional)

**Exaggerated Lithotomy Position**

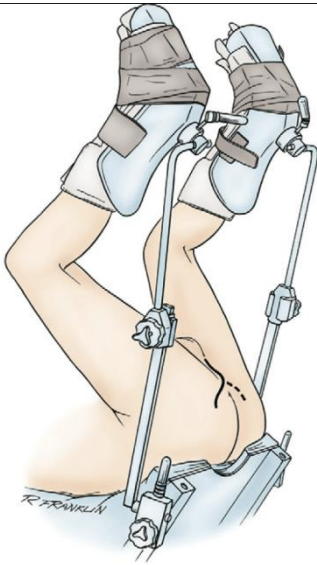


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## **Neeraj Sharma's ...Notes For Urology Practicals**

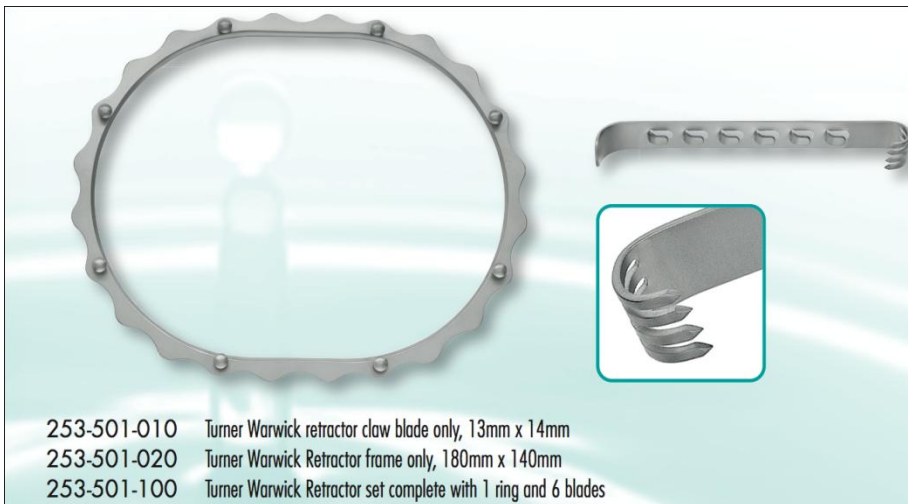
**Q: describe the position for PPUs?**

**A :** extended lithotomy position

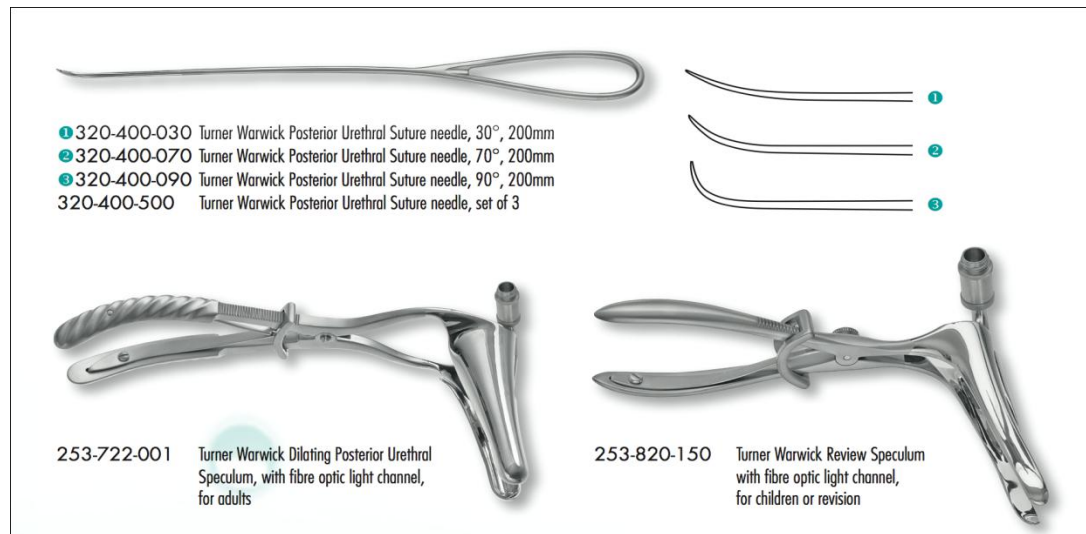


**Q: what are the special instruments needed for PPUs ?**

**A:**



- |             |  |
|-------------|--|
| 253-501-010 | Turner Warwick retractor claw blade only, 13mm x 14mm          |
| 253-501-020 | Turner Warwick Retractor frame only, 180mm x 140mm             |
| 253-501-100 | Turner Warwick Retractor set complete with 1 ring and 6 blades |



**Q: How will you proceed for PFUDD PPUx?**

A:

1. Get orthopedic clearance for extended lithotomy position
2. Consent – Explain
  - route of surgery
  - impotence / E.D
  - Incontinence
  - Restenosis
  - Infection
  - Bleeding Trauma
3. Inj<sup>n</sup> T.T. & Proctoclysis .enema on previous night
4. Local Part Preparation with perineal preparation
5. Morning dose antibiotics
6. Ted Stockings & shift to theatre

Anesthesia - G/A

Position:

- Exaggerated lithotomy position
- Legs placed in guardian stirrups or Allen stirrups
- Buttocks 2 inches hanging from table edge
- Do formal Uretheroscopy

Incision:

- vertical midline perineal incision
- Skin & subcutaneous tissue cut

## **Neeraj Sharma's ...Notes For Urology Practicals**

- The first step of the procedure is circumferential mobilization of the bulbar urethra as far proximally as the obliterated segment
- Dissect the Bulbo spongiosus in midline and hook around the corpus spongiosum .
- Apply Turner-Warwick perineal retractor
- Free the Bulbo spongiosus from the perineal body and lift it away
- Pass a Foleys catheter through meatus and estimate the penile end; Transect the urethra at this level .The proximal urethra is transected at the point of obliteration, and the urethra is then mobilized distally to a few centimeters distal to the crus
- 
- The corpus spongiosum is detached from underlying triangular ligament & corp. cavernosa
- Divide the triangular ligament & develop the intra – crural space
- Deep dorsal vein if encountered is ligated & cut
- Haygroove staff is then introduced into the supra pubic tract, through bladder neck and then into posterior urethra
- Impulse of Haygroove is palpated and all fibrous tissue resected until normal planes reached .
- If the stricture is short and pelvic floor fibrosis minimal, the tip of the sound can be palpated easily in the dissection in the perineum. In these circumstances a one-stage perineal anastomosis can usually be assured
- .
- The tip of Haygroove staff dilator is eventually delivered into perineal wound and 2 stay stitches taken on prostatic urethra.
- Cystoscopy is done to confirm the post urethra , Bladder neck .
- SPC deployed under vision
- The length & alignment of anastomosis is judged. Further circumferential mobilization of the distal urethra as far as the suspensory ligament of the penis. To prevent chordee, the dissection should not extend beyond the ligament, which can be incised to facilitate urethral elongation.
- After this mobilization, the healthy adult urethra can be stretched as much as 2 to 3 cm, which proves sufficient for anastomosis
- Proximal urethra is calibrated upto 32 FCH
- Prostatic Urethra Spatulated @ 12 ' o clock
- Ant. Urethra spatulated @ 6 o clock
- Anterior urethral Mucosa tacked
- All 12, 2,4, 6, 8,10 interment sutures taken
- Posterior wall closed → prostatic end—outside in , → penile end – inside out
- Silicon Foleys deployed 18 Fch
- Ant. Urethral Wall closed
- Drain deployed deep to Bulbospongiosus
- Bulbo spongiosus closed
- Drain deployed over Bulbospongiosus
- Closure done
- Compressing dressing done
- Foleys strapped to abd wall.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: How will you manage Post op Period?**

A: same as Russell's E-E urethreroplasty

- Bed rest 48 hrs
- Tolterodine in post op period
- 21<sup>st</sup> day foleys removal & VCUG
- If no leak then SPC clamp
- SPC removal After 7 days

### **Q: what is the success rate of PPUx?**

A: >90%

### **Q: What are the components of progressive perineal urethreroplasty?**

A:

1. Circumferential Bulbar Urethra mobilization 3 cm gain
2. Crural separation 2 cm gain
3. Inferior Pubectomy 2 cm gain
4. Corporal re-routing 2cm gain

### **Q: what are the additional steps in progressive perineal urethreroplasty?**

A:

- Separation of the proximal 4 to 5 cm of the corporal bodies beginning at the level of the crus distally, dissecting in the relatively blood- less plane between them
- The urethra can be laid between the separated corporal bodies, which can shorten the distance for anastomosis by 1 to 2 cm and is sufficient for anastomosis in 41% of cases
- A 1.5 to 2 cm wide wedge of bone can be excised from the inferior surface of the pubis exposed by corporal separation
- Routing the mobilized urethra between the separated corpora and through the bony defect will further shorten the distance to the prostatic urethra by 1 to 2 cm and facilitates anastomosis in 28% of cases.
- If the urethra still appears to be too short after the three previous maneuvers, the urethra can be re-routed around the lateral surface of a corporal body
- It is necessary to create a tunnel in the bone beneath the corporal body and communicate this with the tunnel created by inferior pubectomy.
- The urethra is then laid in this pathway, re-routing it around the corporal body, which shortens the distance to the anastomosis by 1 to 2 cm.
- This is usually sufficient for the final 23% of cases

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: where will you divide Bulbo-spongiosus?**

A: in midline

It may be dropped / pulled down in 1<sup>st</sup> time op<sup>n</sup> pt. (fresh pt)

**Q: How can you locate the post urethera from upper side?**

A ;

- Pass a Haygroove sound & palpate
- Use a flexible cystoscope & lower lights
- Pass an infant feeding tube, inject dye
- Open the Bladder & see the neck

**Q: How will you ensure that Haygroove staff dilator will go in Bladder neck?**

A: Keep in midline plane, follow the curve gently

Put a finger in rectum and guide the dilator

**Q: What is the side effect of urethral re-routing?**

A: difficult future cystoscopy

**Q: what do you want to save while removing callus/ fibrosis/ corporeal separating?**

A: Avoid injury to cavernosal nerves

Use subperiosteal plane for dissection ( please check this answer)

**Q: What is triangular ligament?**

A: triangular ligament is the ligament between the two corpora cavernosa, as the two corpora separate and move towards ischial rami for insertion

Triangular ligament in the fibrous component of tunica albuginea

**Q: what are the different types of pubectomies?**

A:

- superior pubectomy
- Inferior pubectomy
- Complete trans pubectomy

**Q: What are the advantages or ind<sup>n</sup> for Transpubic approach?**

A:

- Improve visualization
- Tension free anastomosis
- Difficult Excision of scar
- Excision of fistulous Tract and cavities

**Q: what is the incision for transpubic approach?**

A: vertical midline upto base of penis

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you cut pubic symphysis?**

A: 1 cm on each side of midline symphysis , thus a 2 cm piece is removed

**Q: How will you gain more length even after pubic symphysis excision?**

A: Remove the fibrosis callous from underneath the bladder & prostate

**Q: what is the length/height  $\updownarrow$  of Symphysis pubis?**

A: 2 inches (cranio-caudal length)

**Q: what is superior pubectomy?**

A: In superior pubectomy, about 1.5 × 0.5 inch of bone is resected along with the arcuate ligament. This provides an excellent exposure for a tension-free bulboprosthetic anastomosis. The preference for the superior pubectomy is that it greatly facilitates exposure of the normal urethra proximal to the injury site and thereby downward mobilization of the superiorly displaced prostate. This approach helps in managing the associated adverse events, such as the fistulous communication to the surrounding organs and bladder neck incompetence at the same time

**Q: what is inferior pubectomy?**

A: in inferior pubectomy, the inferior margin of pubic symphysis is resected.

This is 3<sup>rd</sup> step in Webster's progressive perineal urethoplasty.

**Q: where will you spatulate the urethral ends?**

A    prostatic end @ 12 o' clock

      Bulbar end @ 6 -o 'clock

**Q: How will you anastomose the urethral ends?**

A: Prostatic end → 12 o clock spatulation → anterior capsulotomy of prostate → put stay sutures → Calibrate upto 32 fch --. Secure the apex → fix the mucosa; tack the urethral ends with 4=0 vicryl so the mucosa does not retract →. Anastomosis posterior layer → deploy silicon catheter → anastomose anterior layer → Drain → perineal region closure → SPC

**Q: How will you fl/up?**

A:

- drain removal on 3<sup>rd</sup> POD
- Foley removal @ 6 weeks & clamp SPC (some centers do MCU at this day to check leak)
- SPC removal after 1 week of Foleys removal (after ensuring that pt.is now voiding well)

**Q: what are the causes of failure to void after Foleys removal?**

A:

1. Foreign body / calculus / encrustations on foleys
2. Anastomosis to false passage
3. Obstruction at the anastomosis
4. Undiagnosed Bladder Dysfunction / Hypocontractile Bladder

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is Koraitim's Triad?**

A: It is a triad for successful outcome after doing PPU

- Complete callus excision
- Mucosa to Mucosa approximation
- Tension free anastomosis

### **Q: What are lengths gained in different steps of PPU?**

A: Circumferential Bulbar urethral mobilization = 2.5 – 3 cm

Crural Separation = 1-2 cm

Corporal rerouting = 2 cm

### **Q: what are the chances of ED after PFUDD repair?**

A: 12-52%

Antegrade ejaculation is preserved in most cases

Type of urethreroplasty has no significant effect.

### **Q: what is Waterhouse's urethreroplasty?**

A :

- it is a combined perineal and abdominal approach
- Perineal incision for mobilization of the anterior urethra and an abdominal incision for transpubic anastomosis between the bulbar urethra and the prostatic apex.
- Around 2 cm segment of pubic symphysis is removed completely.

### **Q what is Mathur's urethreroplasty?**

A: Mathur *et al.* have described a novel technique of "U" shaped anastomosis between the bulbar urethra and the prostatic apex. After the strictured segment is excised, the sutures are taken between both the urethral ends sparing the region extending between 10 o'clock to 2 o'clock positions. The authors propose that this technique has lesser restenosis rates as the urethral blood supply is not hampered.

### **Q: What is ileal urethreroplasty?**

A: Placing a pedicled ileal refashioned flap in between the two distracted urethral ends

### **Q: what is PAPA?**

A: Perineo-Abdominal Progression-Approach (PAPA)

Readers are requested to visit <http://www.strictureurethra.com/urethroplasty/anastomotic-urethroplasty-membranous-urethra.html>



**Q: What is gracilis muscle flap combo?**

A: for restenosed / Re-do operations

- Gracilis muscle will make the Bed
- Do BMG over Gracilis formed Bed

**Q: what is Bangkok Technique for PFUDD repair?**

A: Stage 1: scrotal denuding +BMG

Stage 2: Tubularize / onlay on stricture

***Neeraj Sharma's-***  
**NOTES FOR UROLOGY PRACTICALS**

*Hypospadias*

**HYPOSPADIAS (H/S)**

**Q: what is hypospadias (H/s)?**

A: The term hypospadias is derived from the Greek words hypo (below, too little) and Spadone (crack, gutter). It is characterized by the abnormal position of urethral meatus on the ventral penile shaft.

**Q: is it 'HYPOSPADIAS' or 'HYPOSPADIASIS'?**

A: it is Hypospadias'

**Q: what is the incidence of hypospadias (H/s)?**

A: 1 in 250 males

**Q: What are classical Triad feature of hypospadias (H/s)?**

A:

1. Ventral urethral opening
2. Chordee (the curvature)
3. Hooded dorsal skin (deficient ventral skin)

**Q: Who proposed Hypospadias (H/s) classification?**

A: Barkett (=barcat) (1973) depending upon the position of meatus opening

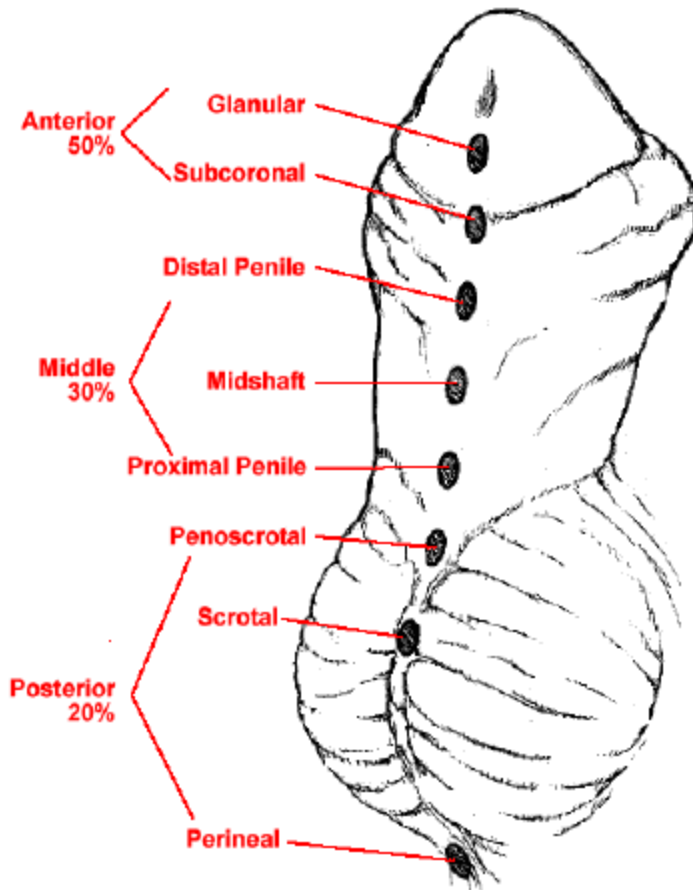
Glanular	}	50%-70%
Coronal		
Subcoronal		
Middle	- 30%	
Posterior	- 20%	

Modified by Duckett → staging to be done after chordee correction

The most common classification was published by Duckett in 1996. He divided them into anterior (50%), middle (30%) and posterior (20%) hypospadias.

These are also classified according to the location of the meatus.

1. The anterior form: glandular, coronal and distal penile.
2. The middle form: "midshaft" and proximal penile.
3. The posterior form: penoscrotal, scrotal and perineal



**Q: what are the two leading theories of Hypospadias (H/s)?**

A: Ectodermal ingrowth theory (Glenister) Baskin

Endodermal Differentiation theory (Karzrock)

- ➔ Ectodermal ingrowth theory states that the glanular urethral meatus normally invaginates and fuse with the distal end of urethral plate. Disorders of this fusion causes hypospadias
- ➔ In Karzrock theory, the urethral plate continues to grow to distal tip of meatus and later gets differentiated to sq cell epithelium. Failure to differentiate leads to Hypospadias formation

**Q: what is the embryology of urethral development?**

A:

- Testosterone and DHT induce the extension of the genital tubercle into the penis. Growth in length is formed on both sides of the so-called urethral genital tubercle. Thus, the urethral folds form the lateral walls of the deep urethral groove.
- With the disappearance of the urogenital membrane a column is formed, which grows until the bottom of the genital tubercle, but falls short of the distal glans. Endodermal cells from the epithelial lining of the column form the urethral plate.
- Towards the end of the third month the urethral folds join above the urethral plate to form the penile urethra. **The fusion area of the urethral folds starts from the base to the tip of the penis.** However, the tip of the penis is not reached.

## **Neeraj Sharma's ...Notes For Urology Practicals**

- By the end of the fourth month the distal portion of the urethra is formed, through the migration of the endoderm cells from the tip of the penis inward, forming a short epithelial cord, which grows on the existing urethra. This epithelial cord is channeled to form the definitive urethral meatus at the tip of the glans.

### **Q: What is the timing for embryological events of phallus formation?**

A:

- 5<sup>th</sup> week : Phallic button
- 10<sup>th</sup> week Elongation of phallus & ventral groove
- 15<sup>th</sup> week – fusion of urethral folds complete

### **Q: Describe the Neuro vascular anatomy of penis?**

A; Nerves starts as two distinct bundles @ 11'o clock & 1 o clock, under the pubic rami

- As the corpora fuse, the cavernosal fan out from 11<sup>th</sup> and 1'o clock position all along the penis; with no nerve at 12'o clock

### **Q: what is the etiology of Hypospadias (H/s)?**

A:

1. Abnormal decrease in androgen production
2. Limited androgen sensitivity
3. Premature cessation of androgenic stimulation
4. Deficiency of DHT enzymes 5 alpha reductase
5. Adrenal steroidogenesis defect
6. Progestin therapy in early 1<sup>st</sup> trimester IVF/ICSI kids have more hypospadias

### **Q: what is van hook theory for hypospadias (H/s)?**

A: Vanhook described hypospadias as arrest of development of penis and urethra. The level of Hypospadiac urethral meatus and chordee reflect the timing of developmental arrest

### **Q: what are the theories for chordee/ curvature?**

A:

1. Decreased and abnormal development of urethral plate
2. Fibrotic mesenchymal tissue
3. Increased corporal disproportional growth

### **Q: what is the incidence of Hypospadias (H/s)?**

A: 1:300

### **Q: what is the optimal time to operate for hypospadias (H/s)?**

A: 6 months to 12 months

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What are the Familiar Risks / chances?**

A: Risk probability father 77%

Risk probability brother – 10% -14%

Monozygotic male twins 8 fold increase in risk

### **Q: What all will you see in local exam?**

A

- Glans
- Prepuce → (for skin availability)
- Length of stretched penis
- chordee
- Testis (Cryptorchidism)
- Urethral opening
- Co-existence of Syndromes

### **Q: what are the associated conditions with hypospadias?**

A: crypto-orchidism 10%

Inguinal Hernia 10%

### **Q: In which patient will you suspect intersex?**

A:

- Hypospadias with cryptorchidism
- Hypospadias + palpable undescended Testis = 15% chances of inter sex
- Hypospadias + Non – Palpable undescended testis = 50% chances of intersex
- The more proximal meatus ; more chances of intersex
- Posterior Hypospadias h/s (even with both palpable testis) should be investigated for intersex

### **Q: what are the goals of hypospadias repair surgery?**

A:

1. To provide ability to stand & micturate
2. Achieve sexual intercourse
3. Effective insemination

### **Q: When will you not do intersex evaluation in hypospadias (H/s)?**

A: Isolated distal / middle hypospadias H/s

### **Q: what investigations will you do in isolated H/s?**

A: for isolated hypospadias

Hb & urine routine → lab Ix

- Radiological Ix → no need

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: how will you prepare the patient?**

A: If glans width is <15 mm & penile length is less than 25mm

Testosterone enanthate (sustanon) i.m. (2 mg/kg)

- 1<sup>st</sup> dose at (-5) week
- 2<sup>nd</sup> dose at (-2) week
- Surgery at day-0

### **Q: what are the effects of giving Testosterone enanthate (sustanon) i.m?**

A:

- Increases thickness of corpus spongiosum
- Increases vascularity of all tissues planes
- 50% increase in penile size
- Doubling of transverse diameter of inner preputial skin



### **Q: what all preparations can be given?**

A: If glans <15 mm & penile length is less than 25mm

- 250 IU – HCG – Twice weekly
- testosterone 2 mg/kg – injection I.M (-5) weeks and (-2) weeks and surgery at day (0)
- DHT cream LA/BD

### **Q: what are the side effects of prepubertal hormones?**

A: usually safe with no long lasting effects

### **Q: What is Orthoplasty?**

A: correction of penile curvature is known as orthoplasty.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How can you measure chordee?**

A: Penile degloving + artificial erection or pharmacological erection

**Q: what is Gitté's maneuver?**

A: artificial erection by saline infusion into base of penis, 2-5 ml saline to be injected after tying a tourniquet at the base of penis

**Q; how else can you produce erection?**

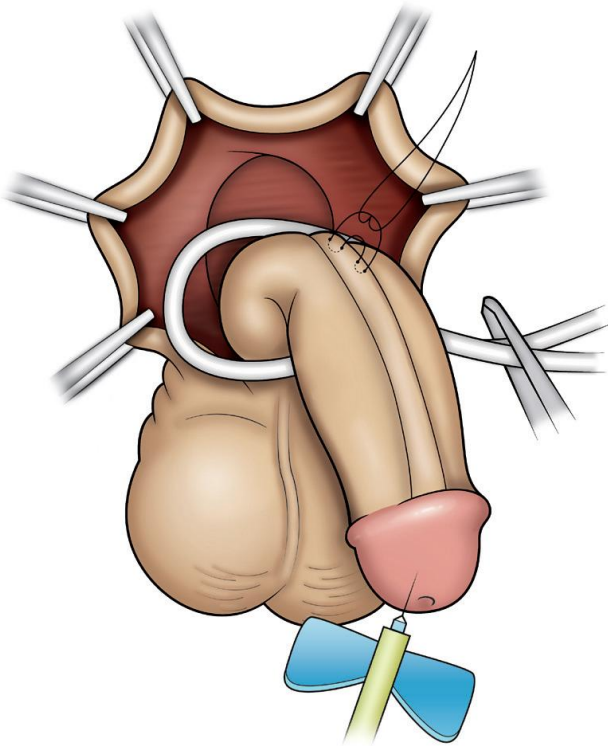
A: pharmacological erection

- Intra corporeal Prostaglandin Inj<sup>n</sup>

**Q: What are the various orthoplasty /chordee correction techniques?**

A;

1. Simple degloving –itself may correct majority of chordees associated with distal and mid penile H/s
2. Nesbit longitudinal dorsal plication-useful for upto 30<sup>0</sup> bending



Nesbit longitudinal dorsal plication

**Q: what is the disadvantage of Nesbit longitudinal dorsal plication?**

A: shortens the penile length to variable extent.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what can be done for chordee more than 30°?**

A:

- step-1 corpus spongiosum and urethral plate mobilization
- Step-2 If still chordee persists then Ventral corporotomy with grafting
- Step-3 Only urethral plate dissection

**Q: what are the other options for chordee correction?**

A: Multiple corporotomies with/without grafting

Koff's corporal rotation (cantwell Ransley Op<sup>n</sup>)

**Q: What is the while paper rule for Orthoplasty?**

A; Curvature Repair

<30° = single midline dorsal placcation (Nesbit's)

>30° = Ventral corporotomy + graft (after urethral plate mobilization) → Sill persistent → Transect plate

**Q: what suture you use for midline plication?**

A: Prolene 6-0

**Q: what is Baskin's method of chordee repair?**

A: Baskin's method of chordee repair

- On dorsum of penis
- Small midline vertical incision x 3
- Close these incision transversely
- Use 5-0 prolene / 60 prolene
- Supplement with dorsal placcation

**Q: what are the components of urethoplasty?**

A: Neo-Urethral formation (1<sup>st</sup> layer)

Neo urethral coverage (2<sup>nd</sup> layer)

**Q: what is tunica dartos?**

A:

- The dartos fascia is a layer of connective tissue found in the penile shaft
- It lies just below the skin, which places it just superficial to Buck's fascia in the penile shaft.
- In the penis, the loose attachment of the Dartos fascia to Buck's fascia is responsible for the high degree of mobility of the penile skin over the underlying tissue.
- It is also responsible for carrying the blood supply of the penile skin, a longitudinally-coursing anastamotic network of vessels that arise from the external pudendal vessels

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the dartos flap?**

A: 2<sup>nd</sup> layer covering

Inner preputial layer is based on dartos flap

Please read: Longitudinal Dorsal Dartos Flap for Prevention of Fistula after a Snodgrass Hypospadias Procedure, By: Miroslav L. Djordjevic, European Urology, Volume 50 Issue 1, July 2006, Pages 53-57

**Q: what is tunica vaginalis flap?**

A:

- 2<sup>nd</sup> layer covering (3717/ ed.9<sup>th</sup>)
- Tunica vagina from the Testis is transposed to neourethra

**Q: what is the Best time for repair H/S?**

A; 6 months to 1 year of age

**Q: what antibiotics will you use?**

A: 3<sup>rd</sup> generation cephalosporin

**Q: How will you do hemostasis?**

A:

- Use of monopolar cautery is contra-indicated
- Bipolar cautery can be used carefully
- Use of tourniquet is favored
- S.O.S use of diluted epinephrine

**Q: how will you close /suture neo urethral tube?**

A: Subcuticular absorbable running suture

Edge of the epithelial surface is inverted and raw surface are stitched

**Q: what is PDS & Vicryl?**

A: PDS= Poly diaxone: absorbable monofilament

Vicryl = Polyglactin: absorbable braided

**Q: what suture do you use for h/s repair?**

A: P.D.S

**Q: Do you catheterize the Pt?**

A; yes, we deploy a 5 Fch feeding tube and stitch it to glans

**Q: How do you do the dressing?**

A; Soft compression dressing

1<sup>st</sup> dressing change @ 5<sup>th</sup> POD

FI/ by antibiotic ointment only

## Neeraj Sharma's ...Notes For Urology Practicals

**Q: How do you prevent post operative penile erection?**



A: Diazepam or lynoral

**Q: how will you prevent Bladder spasms?**



A: oxybutynin 0.2 mg/kg @ 6 hrly

**Q: What is BEAM?**

A: Bulbar Elongation Anastomotic Meatoplasty

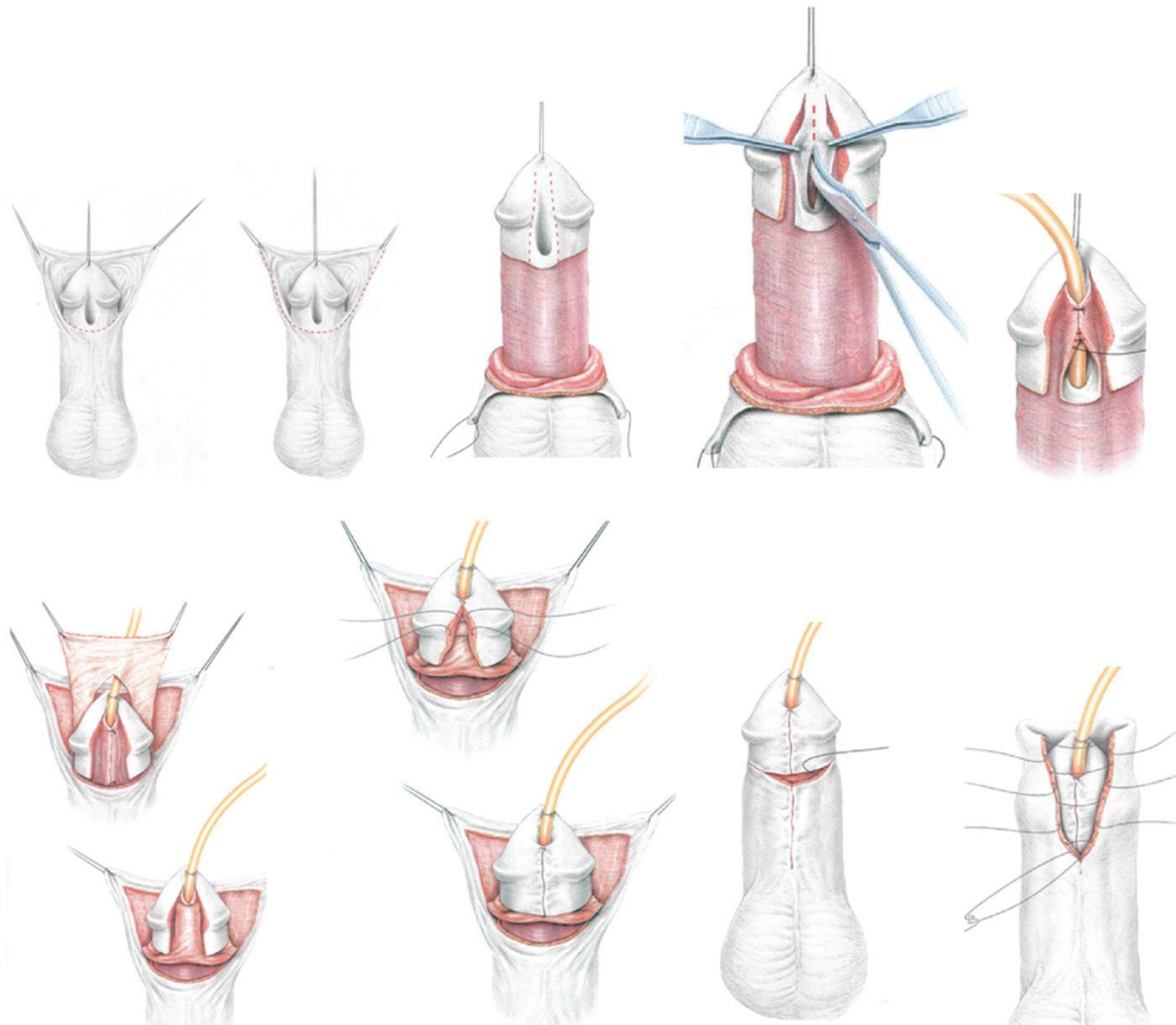
Mobilization of urethra upto bulbar region, to gain 2 cm length, used for distal h/s.

### **DISTAL HYPOSPADIAS**

**Q: what is the most common Tubulariz<sup>n</sup> technique?**

A: TIP Snodgrass

The most commonly performed operation to repair distal hypospadias is the TIP repair. Although other procedures such as MAGPI, Mathieu flip-flap, and urethral advancement remain in use, a survey of current practices indicates these together account for less than 10% of distal procedures (Campbell 10<sup>th</sup> ed<sup>n</sup>)



**Distal tubularized incised plate repair.**

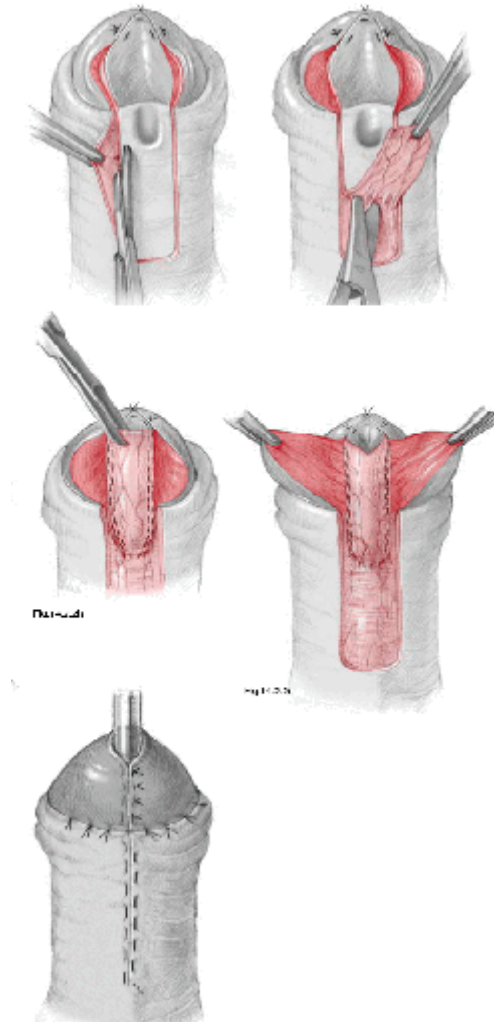
- A. Circumscribing incision is made approximately 2 mm below meatus when circumcision is desired.
- B. Ventral V incision when foreskin reconstruction is planned.
- C. Penis degloved (or only ventral surface exposed during foreskin preservation). Visible junction of glans wings to urethral plate is marked and then infiltrated with 1 : 100,000 epinephrine.
- D. Midline incision of the urethral plate extends from within the meatus to the end of the plate, without entering the distal glans. Incision continues to near the corpora cavernosa.
- E. Urethral plate tubularization begins distally approximately 3 mm from the end of the plate, ensuring an oval, not rounded, meatus. Subepithelial running 7-0 polyglactin sutures proceed proximally. A knot is tied, and then suturing returns distally to complete a two-layer closure.
- F. Dartos flap is dissected from the dorsal prepuce and shaft skin, buttonholed, and transposed ventrally to cover the neourethra. A flap can usually be developed from the ventrolateral dartos in patients undergoing foreskin Reconstruction
- G. Glansplasty begins distally, and a 7-0 polyglactin suture is used to create the meatus at the desired location, independent of the underlying urethral plate tubularization. A second 7-0 polyglactin suture under the first reinforces this distal approximation. Then a single layer of 6-0 polyglactin interrupted subepithelial sutures completes the glans wings closure to the corona.
- H. Shaft skin closure for circumcision after excising excess prepuce and approximating the inner preputial collar ventrally. Interrupted subepithelial 7-0 polyglactin is used.
- I. Foreskin reconstruction performed in three layers using 7-0 polyglactin sutures: inner prepuce, dartos, and outer shaft skin are separately approximated using subepithelial 7-0 polyglactin.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q; what is Mathieu Flap?**

**A;**

- Mathieu flip flap technique
- Used for coronal/subcoronal h/s
- Measure the distance of glans tip to present meatus and draw an equal length flap proximal to present hypospadiac meatus
- Flip the proximal flap over distal flap transversely and second layer covering with dartos. Followed by glans and skin closure.
- For Mathieu Flip flap Skin proximal to meatus should be thick & pinchable. Glans should be well clefted



**Q: what is the dis adv of Mathieu flip flap?**

**A**

1. Transverse lying fish mouth urethral meatus (c.f. TIP Snodgrass vertical meatus)
2. The flipped flap may have compromised blood supply
3. The donor site (flipped site) defect is large and may require SSG/Closure.
4. Can be done only for distal hypospadias
5. Skin just proximal to Hypospadiac meatus should be supple, freely mobile and healthy.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How do you correct / modify Mathieu's repair?**

A: "v" shaped incision at ventral flap and thus making vertical meatus

Y-v modification of Mathieu's repair

**Q: what is MAGPI?**

A: MAGPI (Meatal Advancement and Glanuloplasty Incorporated)

This technique may be used in glanular hypospadias with mobile urethral meatus that can be pushed to the tip of the glans. If the meatus is not mobile enough, the results are less satisfactory.

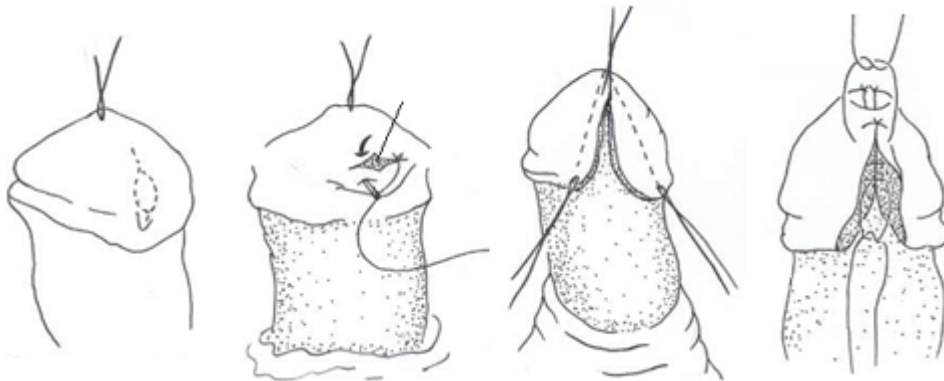
Meatal advancement: The dorsal lip distal to the meatus is cut longitudinally to avoid urine deflecting downwards. In the classic MAGPI, the incision is closed transversely (Heineke Mickulicz technique). Thus the dorsal meatal edge is advanced distally.

The glanuloplasty is accomplished by elevating the ventral edge of the meatus forwards and rotating the flattened glanular wings upwards and ventrally in a conical manner. It is important to reapproximate glans tissue in a two layers fashion with a deep closure of glans mesenchyme and a superficial layer of glans epithelium

### Complications

Meatal regression may occur if the technique is used in patients with immobile urethral meatus.

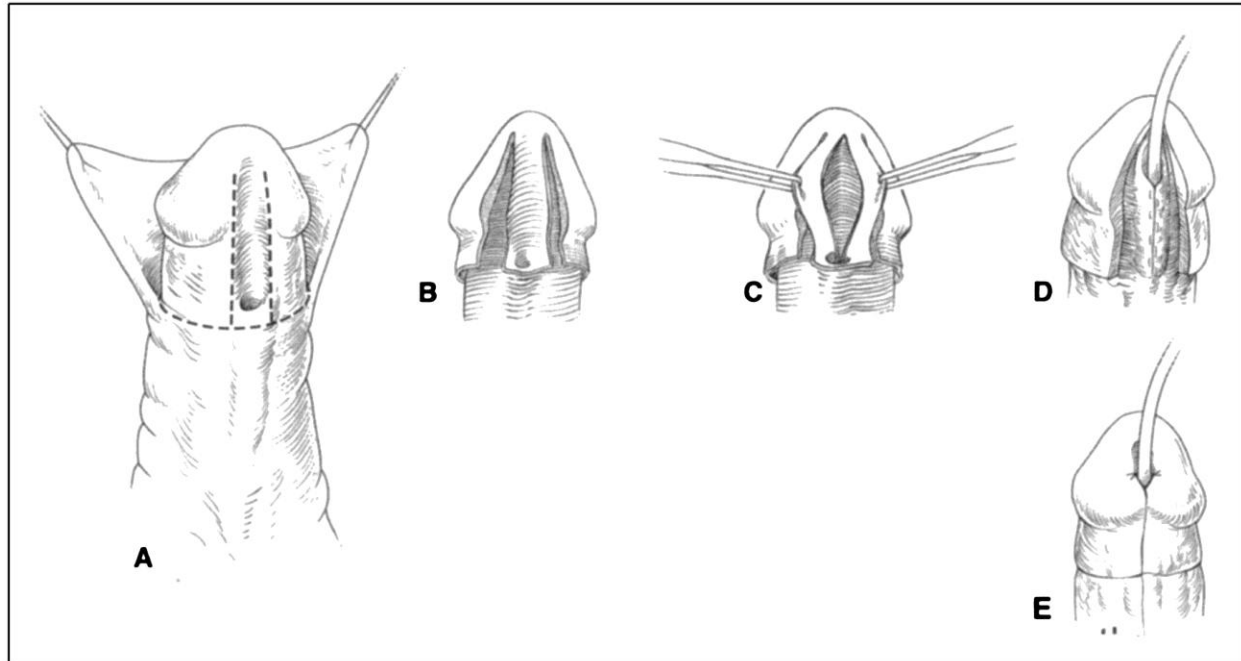
Precision is required to achieve a conical glans.



**Middle Hypospadias Repair**

1. Snodgrass TIP
2. Duplay's Onlay Flap (OIF) onlay island flap
3. Split Prepuce "in-situ" – Onlay

Snodgrass TIP

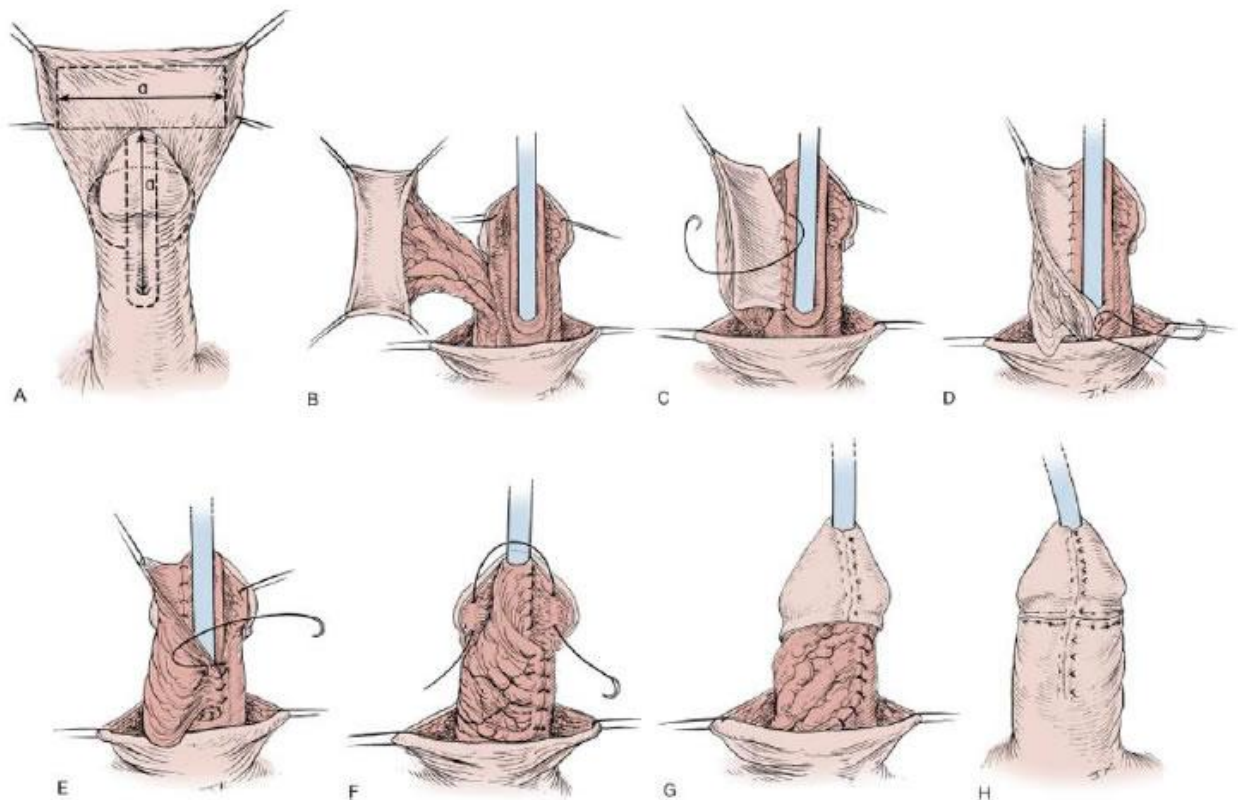


- Snodgrass TIP essentially remains the same whether done for proximal, middle and distal hypospadias.
- Basic requirement for TIP Snodgrass is good healthy urethral plate and deep urethral plate groove, so that it is easy to tubularize over the catheter.
- Subcuticular stitches are taken for tubularization.
- Most distal three stitches are taken in intermittent pattern.
- Tubularization should not be done up to the most distal end, but should be left a bit short of the final meatus
- Glansplasty should not be very tight to hamper the blood supply of neo urethra

**Q: what is Duplay's onlay flap?**

A:

- Raise the inner prepuce island flap horizontally
- Complete the penile degloving.
- Transpose to ventral side on pedicle (upto urethral plate)
- Deploy Foleys
- Deploy the flap like onlay cover over urethral plate longitudinally
- Tunica vagina covering as 2<sup>nd</sup> layer.
- Skin closure



**Q: what us Split prepuce in-situ onlay?**

A:

- Split the full thickness prepuce in dorsal midline
- Transpose one half to ventral surface
- Area required Tubularize is left epithelized and rest of the flap is de-epithelized
- Close like onlay flap over foleys catheter
- Cover with tunica vaginalis /tunica dartos as second layer
- Close the skin



**Q: what are the one stage techniques for proximal H/S**

**A:**

- Duplay's onlay
- Snodgrass Tip
- Duckett's tube
- Asopa Tube
- Koyangi's Repair

**Q: What is ASOPA-1 tube?**

**A:**

- prepuce tube is tubularized as neo urethra and outer prepuce as skin cover
- ASOPA TECHNIQUE for Hypospadias-**Asopa technique uses full thickness prepuccial skin i.e. both inner and outer layers**

**Readers are requested to read --**

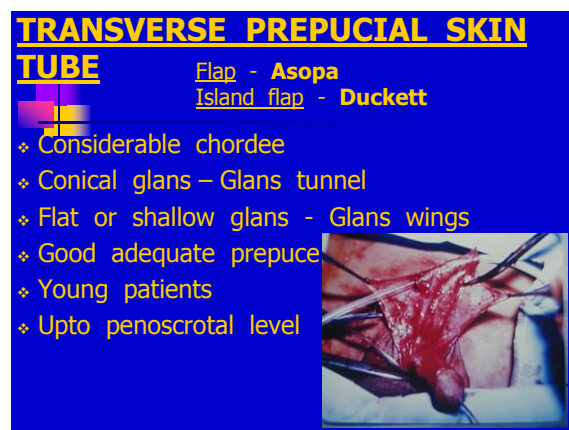
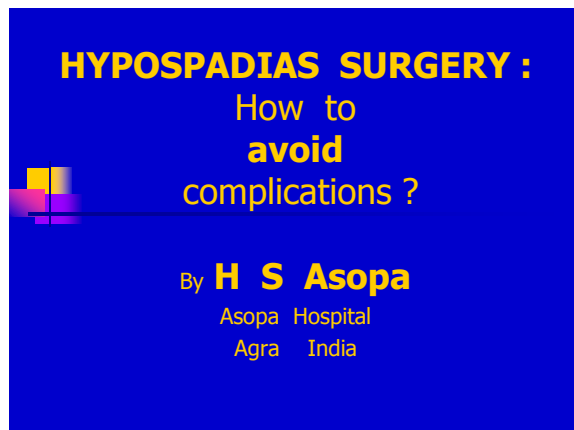
**One stage correction of penile Hypospadias using a foreskin tube. A preliminary report.**

**Int Surg 1971; 55:435-40 Asopa HS, Elhence EP, Atri SP, Bansal NK.**

**Q: what is the difference between Asopa's and Duckett's inner preputial flap?**

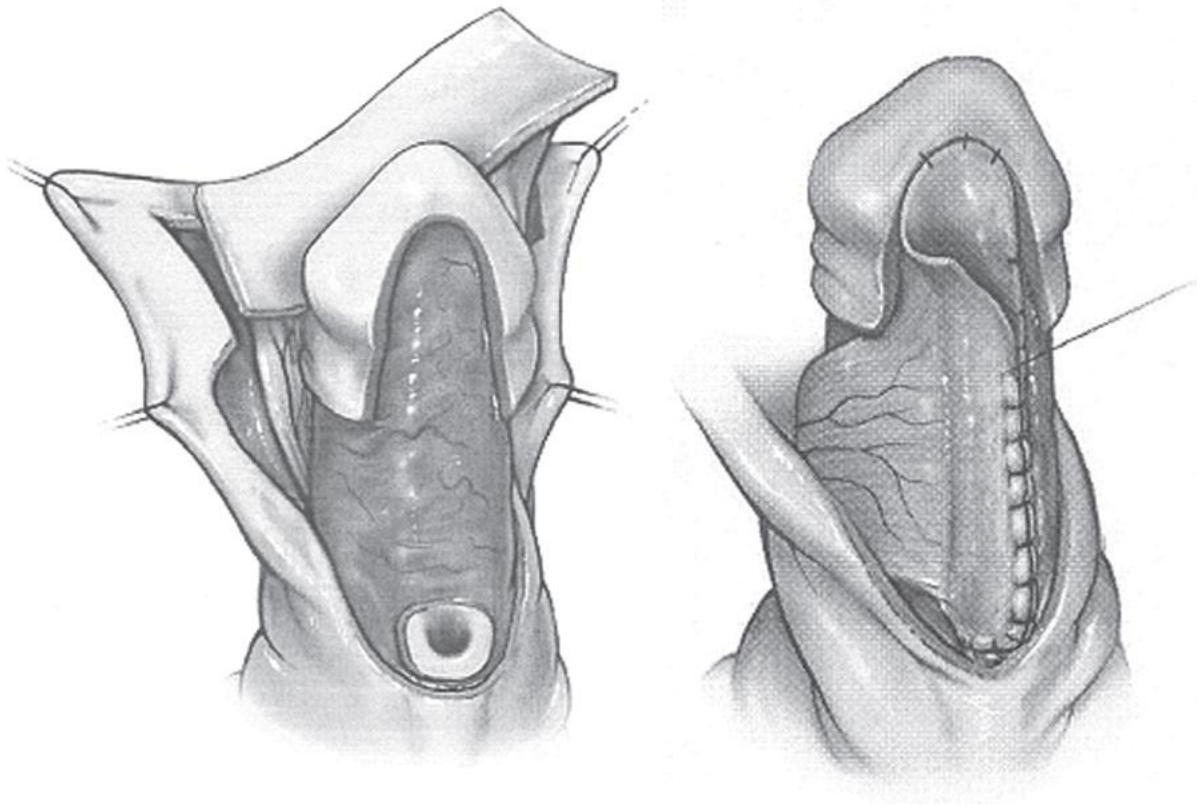
**A:** Asopa's is a free flap where as Duckett's is an island flap

**Source:** <http://www.slideshare.net/drravikanojia/hypospadias-surgery-how-to-avoid-complications>



**Q: What is Duckett's tube?**

A: inner preputial transverse flap tubularized, also known as TPIF  
Tubularized Transverse Prepuccial Island flap



**Q: What should be the flap width needed for Duplay's prepuccial flap and Duckett's preputial tube?**

A; Duplay's – 7mm for onlay  
Duckett's -15mm for tubularization

**Q: On what catheter is neo urethra formed?**

A: 6 fch Silastic Catheter in neonates and infants.

**Q: How will you align Duckett's tube in place?**

A: the neo-urethral suture line should face dorsally i.e., (go towards ventral aspect of corpora cavernosa) (in between the neourethra & corpora cavernosa)

**Q; how is the glanular part of Urethral neo tube made**

A: Either a core through piece of glans is taken or glans wings are deeply incised

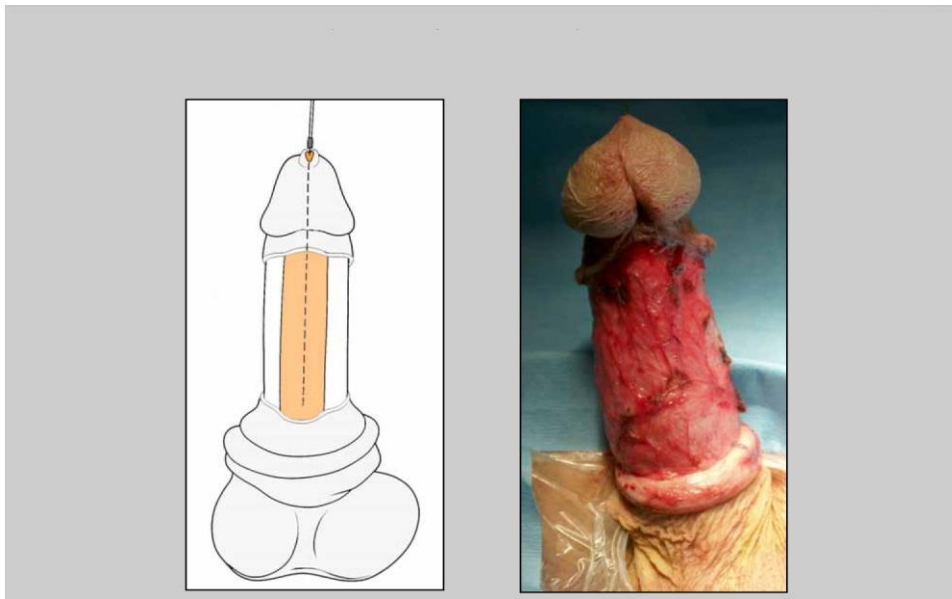
## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is ASOPA -2 operation technique for long anterior penile stricture?**

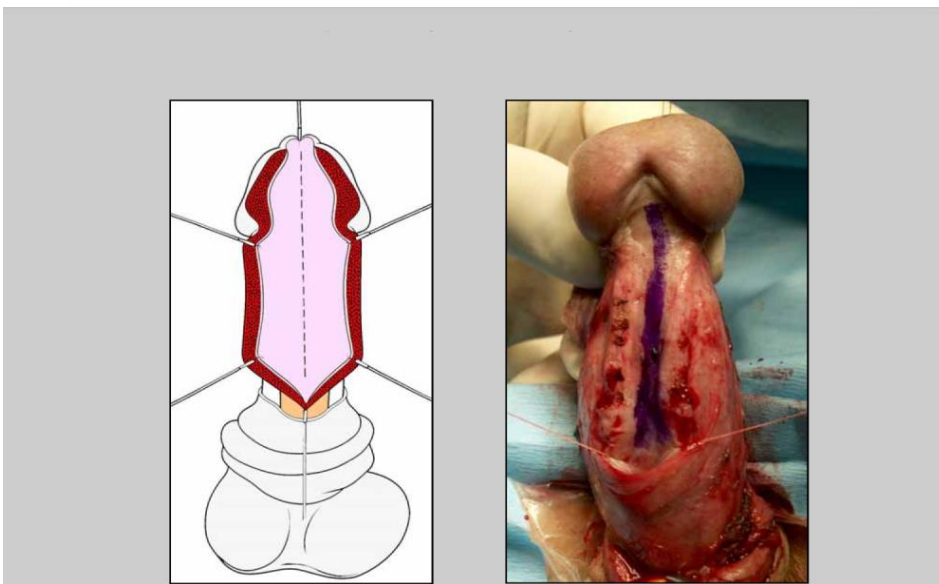
**A:** dorsal inlay BMG urethoplasty

- Shape – ovoid with acute 'V' at angles
- Donor site – buccal mucosa
- Blood supply-free graft
- Fixation with urethra- inlay dorsal after doing ventral urethrotomy in longitudinal axis

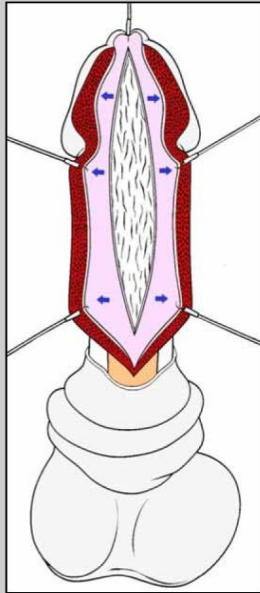
● **Asopa's technique**



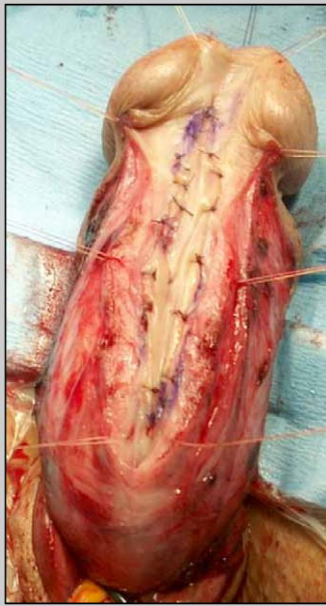
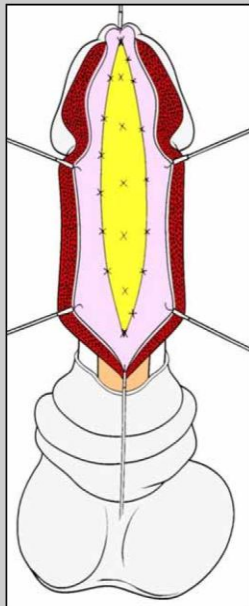
● **Asopa's-2 technique**



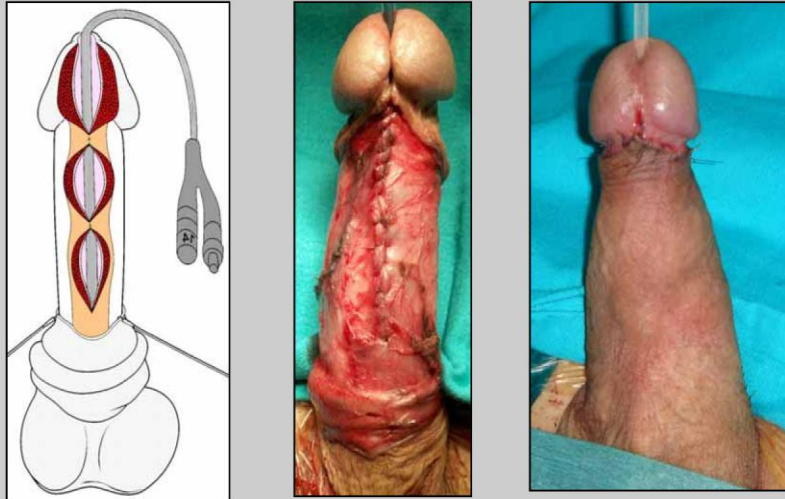
● **Asopa's -2 technique**



● **Asopa's technique**



● **Asopa's technique**



**(Reader Is Requested To Check And Verify Personally.....many people may not agree with this)**

**Please read—**

**Dorsal onlay (Barbagli technique) versus dorsal inlay (Asopa technique) buccal mucosal graft urethroplasty for anterior urethral stricture: a prospective randomized study**

**PMID: 23931150**

**Q: what is Koyangi's repair?**

A: whole of the inner prepuceal lining is separated from prepuceal skin  
Inner prepuce is longitudinally split and brought to the ventrum & tubularized  
Outer prepuce is closed over line Byar's flap

**Q: what is manta-wing flap?**

A; Koyangi's flap is also called Manta wing

**Proximal Hypospadias: Two Stage Repair**

**Q: What are the two stage repair techniques?**

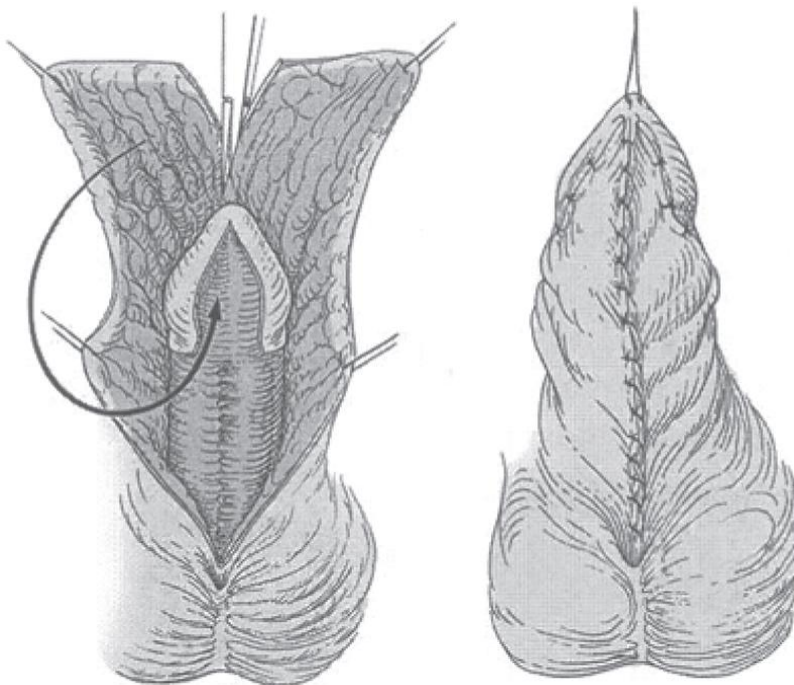
**A:**

1. Byar's flap
2. Two stage preputial graft

**Q; what is Byar's flap 1<sup>st</sup> stage?**

**A**

- Creation of glans wings
- Excision of urethral plate
- Dorsal split of prepuce
- Transposing prepuce to ventral side
- Extend prepuce, deep in to wide opened glans



**Q: what is the limitation for Byar's flap?**

**A:** cannot be done in already circumcised patient  
Penile shaft skin may be hairy to variable extent

**Q: when will you do 2<sup>nd</sup> stage?**

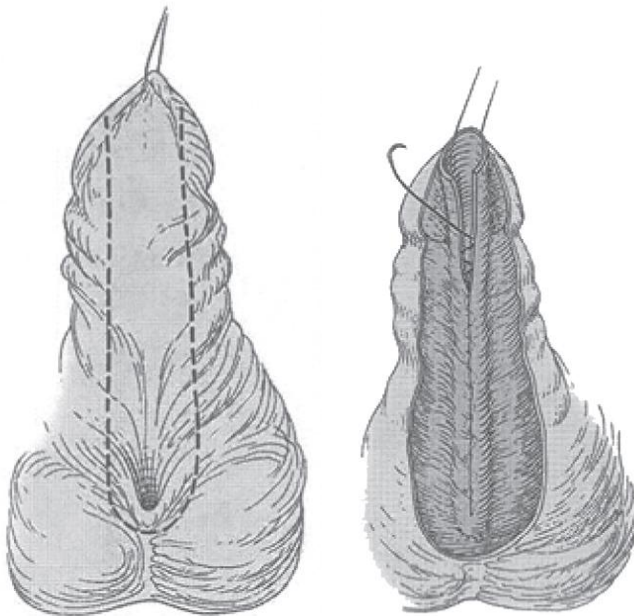
**A:** After 6 months



**Q: What is the 2<sup>nd</sup> stage of Byar's operation?**

**A:**

- Tubularization of skin (as in Thiersch duplay tubularization manner)
- 15mm width
- 2<sup>nd</sup> Layer cover by tunica vaginalis flap
- Lateral ends of the skin are sutured over the 2<sup>nd</sup> layer (tunica vaginalis flap)



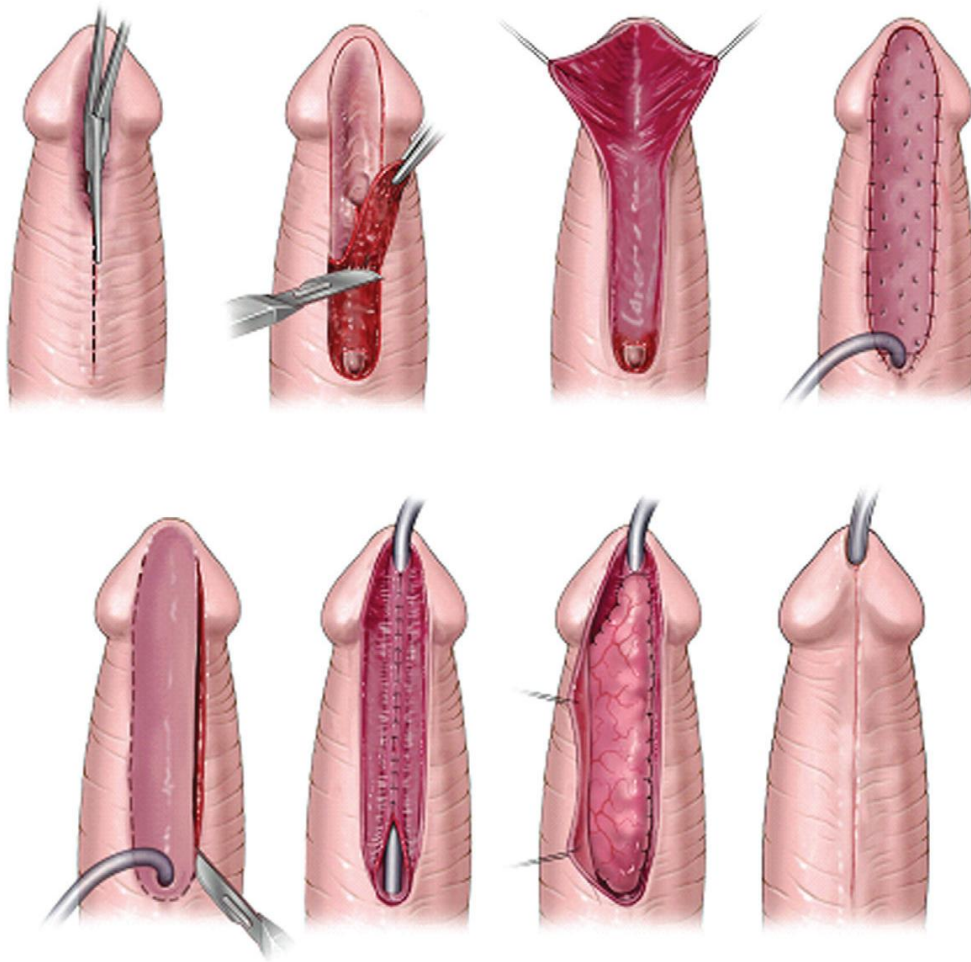
**Q: what is Brakka's repair?**

**A;** Two Stage Buccal Mucosal Hypospadias repair

1st step; chordee correction + urethral plate excision + buccal grafting

2<sup>nd</sup> stage: Tubularization of Buccal Graft





Historical surgery

**Q: what is Denis Browne Operation?**

A; in 1946, Denis Browne performed the buried skin stripe technique showing a spontaneous re-epithelialization of a neo-urethra around a catheter.

1<sup>st</sup> stage:

- the urethral plate & scarred tissue is excised
- Temporary Perineal Urethrostomy is made after 1<sup>st</sup> stage

2<sup>nd</sup> stage: lateral edges of penile shaft are closed in midline

- Make along incision – no tubularization done
- Instead of tubularizing lateral flaps are made and brought in mid-line center as roof of urethra

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What are the complications of Hypospadias Sx?**

A: Early Complication

- Infection
- Meatal stenosis
- Loss of skin flaps
- Oedema
- Hemorrhage
- Erection
- Regressive meatus
- Bladder Spasm
- Catheter Blockage

Rx- antibodies

Rx-do catheterization / stenting

Rx-Compressive dressing

Rx-diazepam/lynoral

### **Q: what is the most common complication?**

A: Urethra cutaneous fistula (appear in few months after Sx)

### **Q: How can you prevent Urethra cutaneous fistula?**

A: Interposing a 2<sup>nd</sup> layer

Avoiding meatal stenosis as Fistula may be associated with distal stenosis

### **Q: What are the causes of meatus stenosis?**

A: narrow meatus Creation

Too tight glanuloplasty

} Mx – Redo, or - Meatotomy

### **Q: What is the m/c cause for meatal stenosis?**

A:

1. When neourethra is tubularized upto distal end of glans
2. Neo urethral edges are stitched to glans meatus
3. BXO

### **Q: How will you manage meatus stenosis?**

A: within 3 months: regular dilation

After 3 months: VIU, meatotomy

If BXO: excise the tissue & deploy the buccal mucosal patch

### **Q: what should be done?**

A: Don't extend neo urethral tube beyond mid glans

### **Q: how will you manage urethral diverticulum?**

A: Circumferential incision → Deglove penile skin → Diverticular Excision → Urethral closure → Reapply penile skin

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: how will you manage recurrent penile curvature?**

A: Usually due to fibrosis

Management- Re-do Orthoplasty / relaxing incision

**Q: what is the m/c site for neourethral stricture?**

A: Proximal anastomosis of neo urethra to native urethra, tube anastomosis have more chances

**Q: What are the causes of stricture?**

A: Technical error, Ischemia, BXO

**Q: What are the causes of Dehiscence?**

A: technical Factors, Glans size small, wound infn.

**Q: which type of repair has maximum chances of forming diverticulum?**

A: Tubularized Urethoplasty

**Q: how will you manage post op fistula**

A:

- Rule out distal obstruction & multiple fistula
- Circular incision around fistula, isolate the tract, excise, and do repair
- Put a intervening layer & close

**Q: How will you manage diverticulum**

A:

1. Exclude distal obstruction
2. Midline ventral skin incision
3. Expose the diverticulum
4. Excise the diverticulum & close
5. Put a vaginalis flap

**Q: what are the indn for re-do TIP?**

A:

- Coronal fistula with a thin bridge
- Meatal stenosis
- Dehiscence when urethral plate is not grossly scarred

**Q: Who Coined the Term Hypospadias Cripple?**

A; Devine & Horton

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q; what is Hypospadias cripple?**

A: Pt who had undergone multiple hypospadias repair attempts

- Growing distorted penile anatomy & fibrosed / scarred urethral plate

### **Q: what are the options available for repairing Hypospadias cripple?**

A:

1. If urethral plate is available = Tip Snodgrass
2. If urethral plate is not available skin = Horton & Devine two stage using skin graft
3. Bracka = two stage using buccal mucosa
4. Split thickness mesh skin graft (modified Johansson's)

### **Q: What are the syndromes associated with hypospadias?**

A:

WAGR – Wilms, Aniridia, Genital abnormality, Retardation mental.

### **Q: What are the Syndromic association of Hypospadias**

A:

<b>Syndrome SWOH WD</b>	<b>Hypospadias</b>	<b>Mental Retardation</b>	<b>Facial Deformation</b>	<b>Limb Deformity</b>	<b>Anorectal malformation</b>
<b><u>S</u>mith lemli - <u>o</u>ptiz</b>	+	+	+	Syndactyly	-
<b><u>W</u>AGR</b>	+	+	Aniridia	Wilms Tumour	
<b><u>O</u>ptiz G</b>	+	+	Cleft lip, cleft palate	Hyper telorism	Tracheo esophageal fistula
<b><u>H</u>and foot genital syndrome</b>	+			B/L great Toe & thumb dysplasia	-
<b><u>W</u>olfhirsh horn</b>	+	+	+	-	-
<b><u>D</u>eletion syndrome 13 q</b>	+	+	+	Penoscrotal transposition	Imperforate anus

***Pneumonic: SWOHWD; Sexy Wife Of His Went Disappearing (because of his Hypospadiac penis )***

### **Q: Q; what are the syndromes associated with microphallus / genital abnormalities / Hypospadias**

A: Charge →

- Coloboma
- Heart malfunction
- Atresia choanae
- Retardation mental/growth
- Genital deformity
- Ear deafness

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the indications for doing cystoscopy in a case of hypospadias?**

A; for Proximal, perineal & Penoscrotal H/S

**Q: When will you find (enlarged) prostatic Utricle?**

A: In penoscrotal & perineal H/S

**Q: what sutures do you use in H/S sx?**

A; 6-0, 7-0 – PDS Polydioxone

6-0, 7-0 – Polyglactin Vicryl

**Q: What Foleys do you user?**

A: 6 Fch DJ stent for prepubertal boys

Or 8 -Fch feeding tube

12 Fch silicon for Post pubertal Boys

**Q: what is the white paper rule for uretheroplasty?**

	1 <sup>st</sup> choice	2 <sup>nd</sup> choice
3 <sup>rd</sup> choice		
Distal →	TIP	MAGPI
Mathieu's flip-flap		
Mid shaft →	TIP	Duplay
Duckett Koyangi's		
Proximal →	Bracka	Byar's
Re-do →	Bracka	Johansson's

**Q: what are the two factors determining repair of proximal H/s?**

A;

1. Status of urethral plate
2. Curvature degree

**Q: From which end glansplasty begins?**

A: distal end

**Q: what is the peculiarity of neo meatus is Snodgrass?**

A:

- Urethral neotube doesnot form any part of meatus and meatus is thus totally separate
- Urethral plate remains short of meatus
- Meatus is formed by glansplasty
- The neourethral plate is stitched in two layers

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the peculiarity of Snodgrass in proximal H/S**

A: Neo urethral is first covered with spongiosum tissue (spongioplasty done)  
Over this Tunica vaginalis barrier flap is added

**Q: What is tabularized preputial flap called?**

A: Duckett

**Q: what is onlay preputial flap called?**

A: Duplay's → only inner preputial  
Asopa → with outer Ectodermal preputial skin with inner preputial skin

**Q: How many stages does Koyangi's repair has?**

A: one stage preputial

**Q: what are the differences between Koyangi's flaps and Byar's flaps?**

A: koyangi flaps are only inner preputial (single stage) Byar flaps are full thickness skin (2 stages)

**Q: what is the difference b/w Asopa & duplay?**

A: Duplay is only inner preputial flap  
Asopa is full thickness preputial flap

**Q: what are results of various Hypospadias surgeries**

Type H/S	Operation	Success	failure
Distal	Tip (Snodgrass)	91%	9%
Mid shaft	Tip, Duplay's	87% 75%	13% 25%
Proximal	Tip Koyangi Duplay Ducket Byars Two stage Braka	75% 73% 66% 66% 80% 85%	25% 27% 34% 43% 20% 15%

**Q: what is white paper rule for proximal H/S**

A: 1<sup>st</sup> choice

- 2 stage repair
- Inner preputial
- BMU (Brakka's)

2<sup>nd</sup> choice – Byar's

3<sup>rd</sup> Choice – Koyangi's

**Q: When will you remove dressing?**

A: 5<sup>th</sup> Pod.

**Q: when will you remove Foleys?**

A: 10<sup>th</sup> Pod

**Q: what do you give for preventive erection?**

A; we in institute give Nothing (some people give diazepam / lynoral)

**Q: How will you fl/up the case of Hypospadiac repair?**

A: After discharge

- 1<sup>st</sup> fl/up @ 1 month
- 2<sup>nd</sup> fl/ up @ 3 months
- 3<sup>rd</sup> fl/ up @ 6<sup>th</sup> month, then sos

**Q: what are the main stay features of fl/up?**

A:

- asking pt & / or care giver about any leak
- Urine stream -→ strength of stream, → splaying of stream
- Neo urethral calibration
- Uroflowmetry

**Q: When will you do neo urethral calibration?**

A;

- @ 3 months (only if pt is symptomatic or meatus looks small)

**Q: when will you suspect obstruction on uroflow?**

A: When uroflow curve is 2 standard deviation less than normal

**Q: What is Firlit collar?**

A:

- It is an inner preputial mucosal collar,
- Chevron incision on dorsal aspect and bring it ventrally from both sides (like Byar's flap) & shelter in mid-line
- This Firlit collar is used to make the penis look cosmetically more appreciable with no redundant skin margins

**Please read:**

A favorable experience with rotational flap techniques for fashioning the Firlit preputial collar.

Redman JF. J Urol. 2006 Aug; 176(2):715-7. PMID: 16813926

The mucosal collar revisited. Kolligian ME, Firlit CF. Urology. 2000 Jan; 55(1):114-7. PMID: 10654906

The mucosal collar in hypospadias surgery. Firlit CF. J Urol. 1987 Jan; 137(1):80-2. PMID: 3795371

**Q: What is the normal penile length of neonate?**

A: 3.5 cm length – stretched penile length 1.1. cm width diameter

(Feldman data on European subjects)

Indian data - Normal Values for Penile Standards in Newborns

M J. Kulkarni and N K. Rajendran

The mean penile length was 23.4 mm at 41 weeks. (Full term)

**Q; what is tanner Classification of sexual maturity?**

Stage I	Pubic hair	Penis	Testis
1	None	Pre adolescent	Pre adolescent
2	Scanty	Slight Enlarged	Pink scrotum
3	Dark, less in amount starts to curly	Longer	Larger
4	Resemble adult but less in amount	Larger with glans increase in size	Dark scrotum
5	Adult , medial thigh hair	Adult	Adult & hair



## Neeraj Sharma's ...Notes For Urology Practicals

**Q: what is the D/ds of small penis?**

A:

Buried penis  
Trapped penis  
Webbed penis

} Pseudo

Micro penis - Truly small

**Q: What is buried penis?**

A: Concealed penis due to

- Obesity, suprapubic fat
- Cicatrized scar
- Poor penopubic fixation at base

Mx : supra pubic fat reduction & surgically fixing the penis

**Q: what is webbed penis?**

A: web underneath the penoscrotal junction

Mx – 'Z' plasty

**Q: What is micro penis?**

A; When penis is 2.5x S.D. times less than mean, minimum length 1.9 cm @ birth

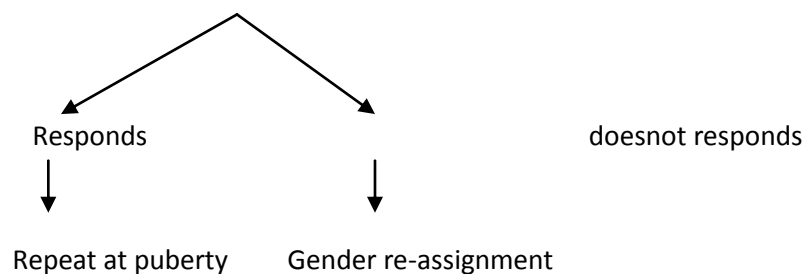
Pubic symphysis to – tip of penis (stretched penile length)

**Q: what are the causes of micropenis?**

1. Hypothalamus → Hypogonadotrophic hypogonadism (Prader-Villi/ Kallman/ Chazot)
2. Pituitary → anterior pituitary failure
3. Testis → Testicular Dysgenesis / Anorchia / Klinefelter
4. Testosterone receptor → androgen Insensitivity syndrome

**Q: How will you manage a case of micropenis?**

A: At birth Intra muscular Testosterone enanthate for 3 months



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is penoscrotal transposition?**

A: when scrotum encircle the penis

Mx: surgical repair

**Q: When will you do this penoscrotal transposition repair?**

A:

1. Option 1: at the time of Hypospadias repair
2. Option 2 ; If Transverse Prepuceal island flap is taken then scrotoplasty is deferred for 6 months otherwise compromise in Duckett's tube blood supply

PENOSCROTAL TRANSPOSITION repair – is done as 3<sup>rd</sup> stage –(6 months after 2<sup>nd</sup> stage)

***Please read the following article for a good knowledge on hypospadias***

Hypospadias Surgery by Professor Ahmed T Hadidi

<http://drravikanojia.tripod.com/sitebuildercontent/sitebuilderfiles/hadidi.pdf>



***Neeraj Sharma's-***  
**NOTES FOR UROLOGY PRACTICALS**

***Lower tract instruments***

**Lower Tract- cystoscopy set**

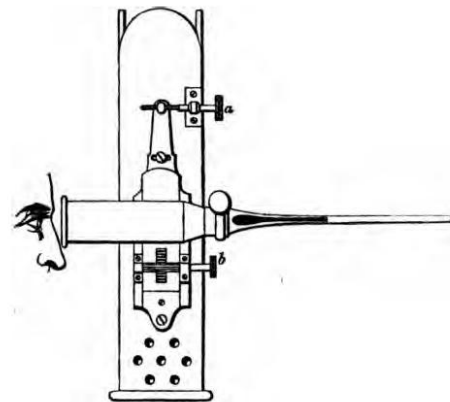
**Q: what is cysto-uretheroscopy?**

A: definition-Directly visualizing the anterior urethra, posterior urethra, prostate & bladder.

**Q: describe the history of cystoscope development?**

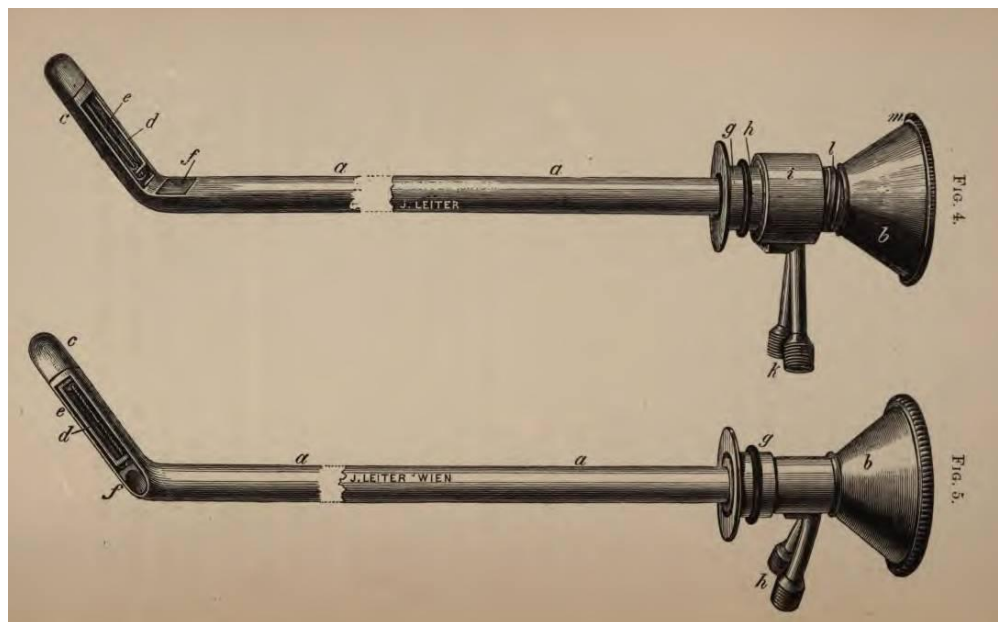
A: The first attempt at cystoscopy was in 1807 by Philipp Bozzini of Frankfurt. His Lichtleiter ("light conductor") consisted of a thin metal tube that allowed reflected candle light to shine into an orifice, such as the urethra. He presented it to the Academy of Medicine in Vienna. Although not really very usable, it was a start and, for the next few years, future attempts at creating a cystoscope were made along similar lines.

Antonin Desormeaux used an alcohol lamp for his light source in 1853. Light was reflected in by a concave mirror and Desormeaux's cystoscope was usable. He reported seeing stones and ureteroceles. This was improved by Francis in 1865 with a rack and pinion, adjustable lens (pictured diagrammatically, right).



Max Nitze realized, however, that the light source had to be in the bladder. He used a heated platinum wire and had an instrument made by Diecke in Dresden in 1877. It was too hot, needed water cooling and kept burning out. A better model (pictured left) was made for Nitze by Leiter, an instrument maker in Vienna in 1879. Although much better, it was still too hot.

**"Cold" Light Sources**



The problem of the hot light source was solved in 1880 by Edison's invention of the incandescent light bulb. This was first used in a cystoscope by David Newman of Glasgow, but, like Kelly's, could only be

used in women.

## Neeraj Sharma's ...Notes For Urology Practicals

In 1899, F Tilden Brown of Baltimore used two different lens systems to visualize the bladder; they could be swapped over using the same sheath to prevent re-instrumentation of the urethra. Leo Buerger expanded on this idea

of passing different instruments down the same outer sheath and the Brown-Buerger cystoscope (pictured right) introduced in 1907, became a standard instrument for years.

### Fibre-Optic Light Sources

During the 1950's and 60's, Harold Hopkins developed fibre-optic light transmission and the rod lens. The German instrument maker Karl Storz combined these ideas leading the way with the modern cystoscope; this was presented at the SIU in Munich in 1967.



**Max Nitze 1848 – 1906**

The Nitze cystoscope was presented to the National Medical College in Dresden in 1877, when Nitze was 28 years old. It is credited with being the first truly functional cystoscope and this

Original design remained essentially constant for almost a century . The instrument consisted of an inner telescope, which contained the lamp and the prism for observation, and an outer sheath, which had an irrigating channel and an operating channel, through which a retractable wire snare could be

attached. Nitze's cystoscope was so popular that in 1910 Christian Jacobaeus used it to perform the first thorascopy and laparoscopy

The cystoscope had seen few changes in design since Nitze's assembly in 1879. The initial 'Lichtleiter' scope by Bozzini in 1806 was illuminated by a beeswax candle on a stand. Nitze and Leiter used a hot platinum wire which required water-cooling, making the whole apparatus rather bulky. The next few years saw Edison's incandescent light bulb developed further by Newman from Glasgow who placed the bulb at the distal end of the scope. The main problems then were constant blowing of the bulbs, and a suboptimal image quality. Despite further development of cystoscopes in the USA, image transmission remained poor in the late 1940s until Hopkins's input.

The traditional cystoscope consisted of a cylindrical tube of air with thin glass lenses. According to Hopkins's research student, it was initially by accident that Hopkins developed thicker glass lenses for ease of mounting and lens stability, and instantly realized the difference in image transmission. He then meticulously worked out the physics, and came up with the glass rod-lens system 18 months later in which the tube had glass rods with thin air lenses. Not only did this improve the image quality and light transmission, it also made the lens mounting and holding much easier. As glass is a better conductor of light than air, and there were fewer glass/air interfaces in the Hopkins system, light scatter was reduced. With the glass-rod system, the internal mounts, which reduced the aperture of the previous thin glass lens, were no longer necessary, leading to a larger aperture, with a brighter, clearer image. Multilayer anti-reflective coating further improved the system so that total light transmission was increased 80-fold. Hopkins and Gow showed the first photographs of the Hopkins system at the Société Internationale d'Urologie (SIU) meeting in Rio de Janeiro in 1961, using a two-filament bulb for illumination.

Hopkins approached all the cystoscope manufacturers in the UK with his idea. Sadly, once again British and American investors failed to see the potential gain of this ingenious invention.

#### **THE KARL STORZ CONNECTION**

In 1965, Hopkins lectured in Cologne, Germany where he presented his work and Gow's photographs. The response was overwhelming, with many requests for his instrument. He had to disappoint the audience saying no one had manufactured it. Hopkins returned to England, and received a telephone call in faltering English from Tuttlingen, Germany. Hopkins replied in fluent German, much to Karl Storz's relief. Storz ran a small instrument company then, and was told of Hopkins's invention by George Berci, a renowned general surgeon and friend of Storz who had seen Hopkins's prototype earlier and was very impressed by it. Within a week, Storz came to meet Hopkins in England and the two men agreed to work together. A contract was made only a few days later. Storz added his own brilliant application to the rod lens: he incorporated flexible fibre-optics used previously for image and light transmission. They presented their winning combination of Hopkins's 'rod lens' and Storz's 'cold light' at the SIU meeting in Munich in 1967, and instantly swept the field

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the components of cystoscopy set?**

A:

- Cystoscope sheath
- Blind Obturator (optional)
- Bridge
- Alberran bridge (optional)
- Telescope

**Q: Describe the Cystoscope sheath?**

A:

- cystoscopy sheath is made up of surgical stainless steel

The most common "surgical steels" are austenitic 316 stainless and martensitic 440 and 420 stainless steels. Stainless steel-316, also referred to as "Marine Grade Stainless Steel", is chromium, nickel, molybdenum alloy of steel that exhibits relatively good strength and corrosion resistance.

Surgical steel resists staining, but it also resists corrosion, which is critical in the operating room.

- Length → 23cm working length with 1 cm markings
- Parts of cystoscopy sheaths-tip, shaft and base

**Tip-** tip is the distal end of cystoscopy sheath

The most distal end (nose) of tip is raised up and has a smooth mould/ mount on the upper side.

This smooth mount helps in atraumatic insertion of the instrument, especially with the 30° scope, in which the operator inadvertently raises the tip of instrument so as to keep the urethral lumen in centre. Thus every time a cystoscopy is done using 30°, the mount brushes against the upper urethral wall. The mount not only prevents urethral wall abrasion but also lifts the upper urethral wall up and shows the urethral passage.





- The lower lip of the tip is half cut and allows the telescope to project out along with the accessory instrument /RGC catheter(single compartment)

### **Shaft**

Shaft of the cystoscopy sheath extends from tip to the 'glans-stop'

Glans-stop is the circular disc mounted across the shaft .it stops the instrument at glans level and thus preventing injury to the glans during procedure. Glans-stop is colour coded for the size of the sheath.

There are 1 cm marking over the shaft .This marking is for measuring prostatic urethra length or urethral stricture length. The length is measured while withdrawing the scope and counting the markings that come out of the glans tip during scope withdrawal.

Distal 10 cm (towards tip) may not have markings as this part always remain inside during cystoscopy



## **Neeraj Sharma's ...Notes For Urology Practicals**

Colour coding of cystoscopy sheaths as per the colour of 'Glans –stop'

Sheath	Colour		
16	navy blue	2x4	1X5
17	Yellow	2x4	1X5
19	Green	2X5	1X6
21	Red	2X5	1X7
22	Blue	2X6	1X9
25	White	2X8	1X12

### **Base:**

- Base of the cystoscopy sheath has a body through which the telescope and instruments pass
- Size of the sheath is written over the base along with the size of instruments that can pass through the sheath when the telescope is in place. Say for example the 19 fch sheath can take one accessory/RGC of 6 fch or two accessory/RGCs of 5 fch each
- There are two side channels for water inflow and outflow with Luer locks
- Lastly there is groove for locking in the bridge.
- There is a '0' written over proximal end to align with '0' of bridge





**Q: What are the advantages of rigid sheath?**

**A:**

- Better optics
- Large Working channel
- Better water flow , Better visualization
- Ease of Manipulation & Stabilization

**Q: What are the markings on cystoscope sheath?**

**A:** 1cm graduations (for measurement)

Distal 10cm (towards tip, there is no markings)

**Q: How many channel does cystoscope sheath has?**

**A:** Only one common single shaft channel

## **Bridge**

Full name: Adapter Bridge –single side channel,  
- Double side channel



- Bridge has a distal end (male end) which gets inserted into the cystoscope sheath.
- The distal end (male end) has a '0' written over it, it should be aligned with '0' written over cystoscopy sheath to allow proper alignment with cystoscopy sheath
- This distal end has a rotating type locking system with teeth. The teeth are aligned with groove of cystoscopy sheath and then rotated clockwise to lock in.
- Opening the lock needs anticlockwise rotation. There is a small knob to rotate the lock clockwise or anti clockwise
- Two limbs: Straight limb → for telescope
  - Angulated limb → for accessory instrumentation
- The straight limb also has a rotating lock system (but female type) to lock the telescope into it.
- This is also rotated clockwise to lock-in. Opening the lock needs anticlockwise rotation.

### **Albarran Deflector Bridge**

**Q: what is deflector bridge known as?**

**A:**

- Albarran deflector bridge
- Deflects the R.G.C catheter downwards
- One straight channel for telescope
- Two angled side channels (inferiorly)
- Two rotator levels (one on each side)

Use: for difficult cannulization of ureteric orifice. It is imperative to use a 70° telescope with Albarran bridge, however no personal experience

**Albarran Bridge** is suitable for accurate articulation of flexible devices and functions on deflecting mechanism while providing for insertion of stone baskets, catheters, biopsy forceps as well as other process support accessories. Coming with thumb wheel or spring deflection mechanism, these are color coded and ensure minimal angulation of accessory ports. These also allow for

## **Neeraj Sharma's ...Notes For Urology Practicals**

rapid assembly/disassembly as well as also provide superior alignment of components with ports designed to accommodate larger accessories.

### **Features:**

- For achieving accurate articulation of flexible devices
- Based on deflecting mechanism
- 1 working channel with provision of inserting stone baskets, biopsy forceps, catheters and other accessories
- Precision wheel mechanism to control deflector lid
- Allows superior positioning of accessories
- Quick locking mechanism with color coded finish
- Allows quick assembly/disassembly
- With deflecting mechanism With 2 working channels, 1 x 12 Charr. and 1 x 9 Charr. with ratchet

<b>Cystoscope Sheath</b>	<b>Catheter Capacities Albarran Working Element</b>	<b>Catheter Capacities Telescope Bridge 2-Channels</b>	<b>Catheter Capacities Telescope Bridge 1-Channel</b>	<b>Colour Code</b>
17 Charr.	1 x 5 Charr.	1 x 5 Charr.	1 x 5 Charr.	Yellow
	2 x 4 Charr.	2 x 4 Charr.		
19 Charr.	1 x 6 Charr.	2 x 5 Charr.	1 x 6 Charr.	Green
	2 x 4 Charr.	1 x 6 Charr.		
21 Charr.	1 x 7 Charr.	2 x 6 Charr.	1 x 7 Charr.	Red
	2 x 5 Charr.	1 x 7 Charr.		
23 Charr.	1 x 9 Charr.	1 x 10 Charr.	1 x 10 Charr.	Blue
	2 x 6 Charr.	2 x 7 Charr.		
25 Charr.	1 x 12 Charr.	1 x 12 Charr.	1 x 12 Charr.	White
	2 x 8 Charr.	2 x 8 Charr.		



Albarran Bridge



Proximal end of Albarran bridge



Distal tip Albarran Bridge

**Q: Who inverted cystoscope?**

A: Max Nitze (German)

**Q: Describe the Telescope?**

A:

1. Length = 30cm
2. Width = 4 mm
3. Parts-Objective lens , Eye piece lens, light pillar,
4. 0°-Green → for uretheroscopy

30° - Red → for Base & Antero lateral aspect of Bladder

70° – Yellow → for Bladder dome

120°-white → for anterior Bladder neck

5. Eyepiece of Telescope is of Bakelite
6. Light post / pillar is for attachment of light cable



**Q: who discovered rod lens system?**

A: Hopkins

- Rod lens system contains glass rods separated by air columns
- Long rods of grounded polished glasses
- More the number of glass rods better magnified will be the image and better image quality

**Q: what is Hopkins I & Hopkins II rod lens system?**

A: Hopkins - I, older version, more air spaces, less glass columns

Hopkins – II, new version, less air spaces, more glass columns

Long rods of grounded polished glasses

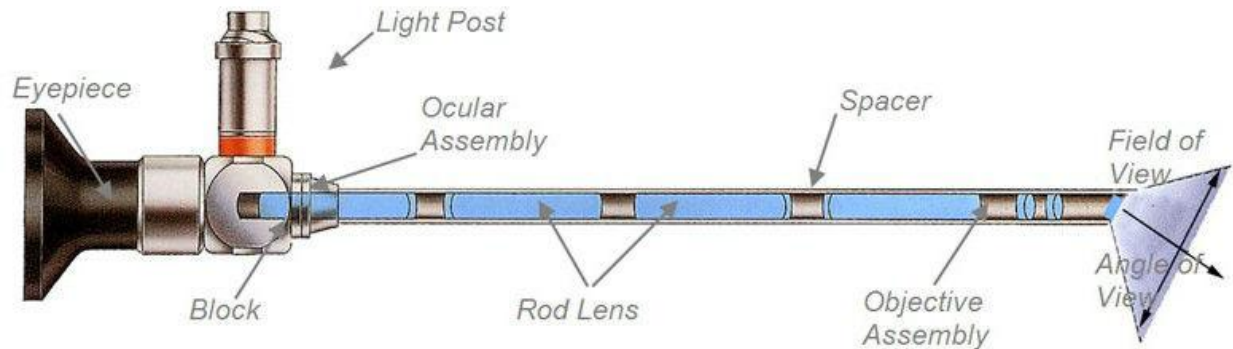
Adv:

1. Improvement in viewing angle from 90° in Hopkins I, to 120° in Hopkins II



## Neeraj Sharma's ...Notes For Urology Practicals

2. Better visualization, more clarity
3. More light
4. Decrease in profile of telescope shaft
5. Hopkins II system is autoclavable



### **Q: What are the parts of telescope?**

A: Tip: it is the distal end and contains two compartments –

- 1) outer /upper compartment for light transmission 2) inner /lower compartment for image transmission
- image transmission compartment contains a prism for deflecting the angle of view ranging from  $0^{\circ}$  to  $120^{\circ}$

shaft : contains the glass rod system and light transmission

body :

- ocular assembly
- 'light post' is attached to the body
- Colour coding is there at the light post for depicting various degrees of angle of deflection.
  - $0^{\circ}$ -Green
  - $30^{\circ}$  - Red
  - $70^{\circ}$  – Yellow
  - $120^{\circ}$ -white

eye piece :

- Made up of Bakelite to prevent current transmission / conduction to operators eye
- If scope is autoclavable then it is written just ahead of eye piece
- Attaches to camera head

### **Q: what is special about $120^{\circ}$ telescope?**

A:

- distal end is closed /blind
- Light hole opens just proximal to the tip but on inferior surface
- Objective lens is just proximal to light hole and is wedge shaped opening with lens appearing to be looking in backward direction
- Light post colour code is white





**Q: what are the different types of lithotomy position?**

**A:**

- Low lithotomy position  $30^{\circ}$  hip flexion
- Std lithotomy  $70^{\circ}$  hip flexion
- High lithotomy  $>90^{\circ}$  hip flexion
- Extended lithotomy  $>120^{\circ}$  hip flexion

**Q: what are the components of lithotomy position?**

**A:** Lithotomy position has '3' components

1. Hip flexion
  - 30 – low
  - 70-std
  - 90-high
  - 120-extended high
2. Hip abduction – Wide spread apart, - std
3. Knee flexion – parallel to the ground (std),  $90^{\circ}$  to femur

**Otis Maurmeyer urethrotome**



**History:**

- Fessenden Nott Otis 1825 - 1900 was an American urologist who calibrated the male urethra, confirming it was 32Ch gauge, thus allowing larger instruments to be developed. The Otis urethrotome is, basically, his "urethrometer" with a dorsal blade.
- used as a torture instrument for looking into the bladders of captative female spies to search for hidden messages /articles in bladder during world war II
- Later on modified by Maurmeyer by making the dilating shaft a double arm parallel opening system and dismountable knob for attachment of filliform dilators.

**Name:** Otis Maurmeyer urethrotome

**Type:** Parallel expanding blade type

**Components:**

1. Distal knob / screw for filliform dilators
2. Parallel expanding Dilating shaft with groove for knife
3. Proximal circular disk & gradations
4. Proximal knob for expansion of blade
5. Knife blade to make a urethrotomy cut

**Tip:**

- tip of the instrument is a conical screw cap which allows smooth entry into the meatus
- If the cap is unscrewed underneath is a screw (male type) on which can be attached female filliform
- Once the female filliform reaches the bladder the Otis dilator can be replaced with male filliform followers and serial dilatation can be done if needed.

**Shaft :**

- Shaft is a parallel expanding blade system
- The two dilating arms remain parallel to each other leading to uniform stretching of urethral mucosa
- Minimum 14 fch lumen is needed to insert the shaft even in completely closed position

## **Neeraj Sharma's ...Notes For Urology Practicals**

- Dilating shaft blades can be opened by rotating the proximal most screw in a clockwise direction
- Amount of dilation can be judged by looking at the circular graduated disc indicator
- Maximum dilatation can be achieved upto 45 fch.
- Once the desired dilatation is done the knife blade can be pulled out in a single smooth pull which makes a urethrotomy cut at 12 o'clock.
- Dilating shaft is then partially closed and the whole assembly is withdrawn out.
- If the shaft is completely closed back there are high chances of entrapment of urethral mucosa between the arms of dilating shaft ,so only partial close back before withdrawing the instrument

Knife blade:

There is a small triangular shaped knife blade with a long shaft and proximal handle

Aligning the knife in its groove is very important and always asked in exam

- Hold the instrument in left hand between four fingers and thenar eminence. keep the left thumb free.
- Keep the tip of knife blade at the proximal end of the knife groove, align the shaft of knife blade into the
- Small wedge knob given at the centre of the graduated disc .
- place your left thumb over the neck of knife blade shaft and support the knife alignment
- Gently push the knife blade making it slide under your left thumb till the whole knife is pushed in .
- avoid buckling of the knife shaft during push
- The triangular knife will completely disappear into the shaft groove as it reaches the distal end .
- now open the dilator shaft by rotating the proximal screw
- See the graduated dial moving from 15 fch mark onwards.
- dilate as needed
- pull out the knife back in a swift action
- partially close the arms of dilating shaft
- withdraw the whole assembly

**Q: what is the working length?**

A: 11 inches

**Q: what are the gradations on the disc?**

A: from 15- to – 45 Fch



**Q: what are the shapes of knife blade?**

A: 3 interchangeable knives

Triangle is the most common shape .The blade should not be seen completely inserted but slowly appears as it is pulled back

**Q: what are the disadvantages of Otis urethrotome?**

A:

- blind procedure
- Before using Otis dilator it is necessary to do a prior uretheroscopy
- Bleeding
- Needs an assistant to hold the penis pulled up over the shaft of instrument
- Otis dilator definitely needs an assistant in male patients as both the hands of surgeon are busy handling Otis dilator –left hand holds the instrument and right hand moves the dilating screw or pulls out the knife.

**Q: what are the uses of Otis dilator?**

A: female:

- Urethral stretching
- Urethral stenosis
- Urethral syndrome management

Male:

- Before TURP
- Anterior urethral stricture

**Q: what is the function of distal screw tip?**

A: attaches to filliform and aids in subsequent dilation by followers

**Q: what is the minimum Foh caliber required for introduction of Otis?**

A: 14 Foh

**Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the other shape available in Otis dilator?**

**A: curved Otis dilator**



**Q: what is the name of VIU set?**

A: Sachse's optical urethrotome



**Q: What are the components of VIU set?**

A:

- Obturator – (for inserting in meatus; otherwise sharp edges erode the urethra)
- Working element → always passive type of working element
- Blade → Straight knife, hook, half moon, serrated half moon
- Telescope – 0° forward viewing
- Half moon sheath

**Q: how will you identify VIU sheath against the cystoscopic sheath?**

A: tip

- The tip of VIU sheath is abruptly straight cut with sharp margins
- There is no mount at the upper lip of VIU sheath

Shaft

- Shaft is oval /oblong in cross section

Base /proximal end

- An angulated side channel is present in VIU sheath in addition to the two side water channels

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Describe the VIU sheath?**

A:

- Sheath is 21 Fch
- Oval shaped / Oblong shaped in cross section
- Proximal angulated side channel can take max, 5 Fch RGC catheter.
- VIU sheath has centimeter gradations

**Q: when will you use obturator?**

A; always (for entering in the meatus)

- VIU obturator is a blind obturator
- After negotiating the meatus the obturator is removed



Blind obturator of VIU sheath

**Q: describe the blades of VIU set?**

A: most commonly used is a straight knife

Straight blade-

- used for soft strictures with minimal fibrosis
- Blade has to go across the stricture and then cut while returning back in passive motion
- Chances of breaking of blade are there in cases of tough strictures

Half moon blade

- Used for tough strictures
- Can cut while actively going in as well as in returning position

Serrated half moon –used for extra tough/fibrosed tissue


**Q: How will you choose correct passage out of the 3-4 false passages ?**

A: Inject methylene blue through SPC/ needle spc puncture

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the complications of VIU?**

A:

- Bleeding
  - Septicemia
  - False passage  
early
  - Urethral mucosa erosion
  - Meatal injury
  - Breaking of Sachse's blade
  - Sphincter injury
  - Epididymo-Orchitis, urinary retention, scrotal abscess.
- 

Late complication:

- re-stricture
- Erectile dysfunction

**Q: How will you control bleeding after VIU?**

A: in the order the following can be done

- Deploy large Foleys
- Compression bandage
- Sylvare's Maneuvre → (Telescoping penile urethra and putting a gauze piece tie ahead for maintenance).
- Bugbee Cautrization
- Open & control bleeding

**Q: where will you make cut's while doing VIU**

A: Usually 12' o clock

If stricture is tough or spongiofibrosis is deep then multiple radial cuts can be made

**Q: what will you do if blade breaks inside?**

A: Take the blade out (don't leave it in)

**Q: how is the working element?**

A: Passive – (Nesbit's)

**Q: which fluid do you use of VIU?**

A: Saline

**Q: What is full name of VIU?**

A: Direct vision – internal Urethrotomy (DVIU)



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: What is the problem with 12 O 'clock cut?**

A: deep cut can penetrate through the corpus spongiosum (which is thinnest @ 12'o clock) into the inter crural space that may lead to bleeding & Erectile dysfn later on.

### **Q: For how long to keep catheter?**

A: 3-4 days

### **Q: what is the success rate of DVIU?**

A: 33-35% (depends upon stricture length / fibrosis /previous VIU attempts).

### **Q; describe the half moon sheath of VIU?**

A: half moon sheath is meant for deploying Foleys catheter after making the way through stricture

- Half moon sheath is pre loaded over the VIU sheath (actually half-moon sheath is on the lower side of VIU sheath )
- Once VIU is complete the VIU sheath is detached from the half-moon sheath, leaving the half-moon inside
- Foleys catheter is then deployed through half-moon sheath and sheath removed
- -Storz half-moon can take 16 Fch Foleys max (Storz Sixteen)
- -Wolf half-moon can take → 14 Fch Foleys max ( wolF- Fourteen)

### **Q: What is the technical name of VIU & instrument?**

A: Direct Vision – Internal Urethrotomy DVIU

Instrument- Sacche's urethrotome/ 21 Fch / with side channel

### **Q: What is the principle of VIU?**

A:

#### **Internal Urethrotomy**

- Internal urethrotomy (surgical incision into the urethra for relief of stricture) encompasses all methods of transurethral incision or ablation to open a stricture.
- The goal of cutting a stricture is to have epithelial regrowth before scar recurs in the same area. At best, the result of urethrotomy is to create a larger caliber stricture that does not obstruct urination.
- Urethrotomy is potentially curative for short strictures (less than 1 cm) that have minimal spongiofibrosis.
- After each successive urethrotomy, there is a period of fleeting good urinary flow, followed by a worsened degree of spongiofibrosis and lingering stricture. There are also reports of lumen (cavity) obliteration, as well as hemorrhage (heavy bleeding), sepsis (a serious, body-wide reaction to infection), incontinence, erectile dysfunction, glans numbness and abnormal erection caused by disease rather than sexual desire.

## **Neeraj Sharma's ...Notes For Urology Practicals**

- In the short-term (less than 6 months), success rates are 70 to 80 percent. After one year, however, recurrence rates approach 50 to 60 percent and by five years, recurrence falls in the range of 74 to 86 percent (depending on stricture length and degree of spongiofibrosis).
- Attempts to improve the mediocre long-term results of internal urethrotomy have been made with laser urethrotomy. Contact mode Nd:YAG lasers have been used to “chisel” out the scar. However, results are not superior to standard techniques.

**Q: what is the type of healing in VIU?**

A: Secondary healing

**Q: At what position do you incise VIU cut?**

A; we do it @ 12 o clock

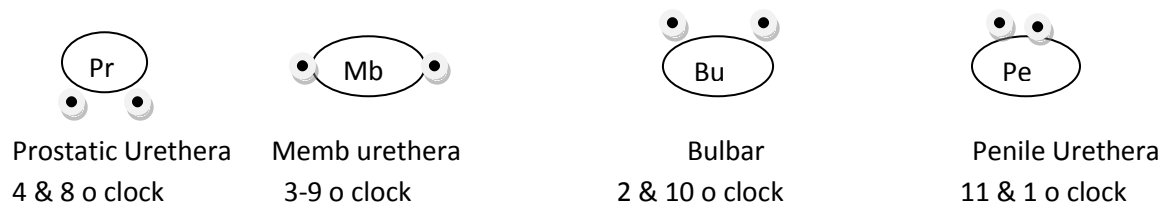
Dis adv

- Corpus spongiosum is thinnest in anterior bulbar urethra and even a single 12 o -clock cut may penetrate spongiosum and may enter the triangular ligament
- DVIU cuts (12 o'clock) can destroy the vascularity of future bed of BMU graft



VIU using cold knife B VIU using holmium laser. C pre VIU-cut .D post incision appearance

**Q: What are the positions for cavernosal nerves w.r.t urethra?**



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is the ideal direction of cuts?**

A: In bulbar urethra either 3 o'clock or 9 o'clock or Mercedes sign cut @ 12, 4, 8 o'clock  
Mercedes Benz cut: 12,4,8 for protecting cavernosal nerves which are at 3' & 9' o'clock

### **Q: What is success rate of VIU?**

A:

- For stricture length <1cm = 70%
- For stricture length 1-2cm = 35%
- For stricture length >2cm = 10%,
- in general 30-35% success (Pansadaro et al)

### **Q: what is the definition of success / failure?**

A; success = no recurrence till 3 yrs

Failure = Peak uroflow  $Q_{max}$  of < 15ml /sec

### **Q: When will you remove foleys after VIU?**

A: 3-5 days

### **Q: Is there any role of urethral intra lesion steroids in urethral stricture Mx?**

A: no

### **Q: What is the role of CIC after VIU?**

A: Yes, Using Nelaton Catheter (= 14 FCH, K-90)

M/C protocol is once weekly for 1 yr (Kajeer-guard – 1988)

### **Q: What is the role of repeat Urethrotomy?**

A: Repeat VIU can be done if stricture recurrence is after 3 months. No role if stricture recurs within 3 months

### **Q: What is the famous series on VIU?**

A: Pansadaro

### **Q: what are the compl<sup>n</sup> of VIU?**

A:

- Bleeding
- Recurrence of stricture
- Meatal injury due to Sacche's sheath
- Breaking of knife blade

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you fl/ up?**

A:

- Baseline uroflow & AUG @ post op 6 weeks
- Uroflowmetry @ 6 monthly x 2 yrs
- Alternately a flexible cystoscopy can be done as office procedure
- Readers are requested to check this answer and answer what is done in their respective institutes

**Q: In what time (post operatively) a stricture can recur?**

A: VIU treated stricture will recur usually in 6 months or at most within one year.

### **DVIU- Direct vision – Internal Urethrotomy operative procedure**

**Ind<sup>n</sup>:** Short segment 1-2 cm anterior urethral stricture

**C/Ind<sup>n</sup>:**

- Long segment stricture > 2cm
- Dense fibrosis
- More than 1 attempt of previously failed VIU
- UTI
- Coagulopathy

**Pre op evaluation:**

- AUG+ MCU
- Urine culture- negative
- Coagulation profile normal

**Preparation:**

3. Local part preparation ; b'coz need for SPC need for antegrade approach
4. Antibiotics as per culture

**Anaesthesia:** S/A, G/A

**Position:** Lithotomy position

**Procedure:**

1. Dorsal lithotomy position
2. Painting & drapping
3. Uretheroscopy for evaluation of urethra → do not cross stricture
4. Deploy guide wire across stricture (position of guide wire can be checked with IITV if in doubt)
5. Take Sacche's urethrotome sheath i.e., blind obturator. Introduce the sheath i.e. Blind obturator to avoid injury to meatus & distal urethra.
6. Remove obturator and introduce the Sacche's blade

## **Neeraj Sharma's ...Notes For Urology Practicals**

7. Stabilize the penis with one (left) hand. Advance the blade into stricture and with an upward anterior stroking release the lever; the blade is retracted back into sheath while cutting the stricture. Cut across the stricture @ 12 o' clock
8. Cut the full thickness till bulbospongiosus is seen (light pink appearance)
9. Keep advancing the sheath & cutting
10. Reach the bladder & do Cystoscopy
11. deploy zebra guidewire through the side channel of VIU sheath
12. Place 18F foley catheter over guidewire .
13. Half-moon sheath can also be used for deploying Foleys catheter. If half-moon sheath needs to be used then it is preloaded on VIU sheath before doing VIU.

### **Post OP:-**

- Remove Foleys after 3-5 days
- Continue antibiotics for 5-7 days
- Anticholinergics may be added if needed.
- Patient is advised to do self catheterization / dilation as per the case
- Fl/up @ 3 months for uroflow.

### **Q: what is the self dilation protocol you use?**

A: 14 F, straight catheter, once daily x 15 days and then tapered gradually

### **Q: What are the compln of VIU?**

A; Early

- Hematuria
- Bleeding
- Infn

- Late

- Fistula
- False passage
- incontinence
- recurrent stricture
- Erectile dysfn.

### **Q: What else can be used for VIU, other than cold knife?**

A: Laser HO: YAG

**Q: what are the major historians of TURP?**

**A:**

- ➔ Edwin Beer → Caultry (underwater)
- ➔ Davis → foot switch of caultry
- ➔ Maximillian stern → cutting loop
- ➔ Mc' Carthy :- Resectoscope Reck 'n' penien type
- ➔ Iglesias ;- Passive working element
- ➔ Baum Rucker: active cutting working element



**Q: what are the components of TURP set?**

**A:** Outer fenestrated sheath

Inner sheath with Bakelite tip

Visual obturator Schmidt's

Working element-either active or passive

Telescope

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Describe the Outer sheath & inner sheath?**

A: classical /older Outer sheath –

- Water /Glycine come out (from the bladder to exterior) through outer sheath
- For outflow
- Distal tip is fenestrated with multiple small holes that lead to water exit
- Water enters the fenestrated holes and runs between the outer and inner sheath to come out finally from the outlet channel at the proximal end of outer sheath
- Most commonly used size is 26 fch outer sheath
- Non rotating type –means when the surgeon turns the resectoscope assembly 90° towards right or left lateral lobes of prostate, the complete assembly turns leading to a torque on urethral wall as well as friction. This leads to higher chances of urethral stricture.
- Down ward out flow channel, out flow channel has a arrow marking on it depicting that it is meant for outflow



Classical outer sheath



**Q: what is the name of method by which irrigant comes out of *Iglesias sheath*?**

A: Siphon method / capillary method

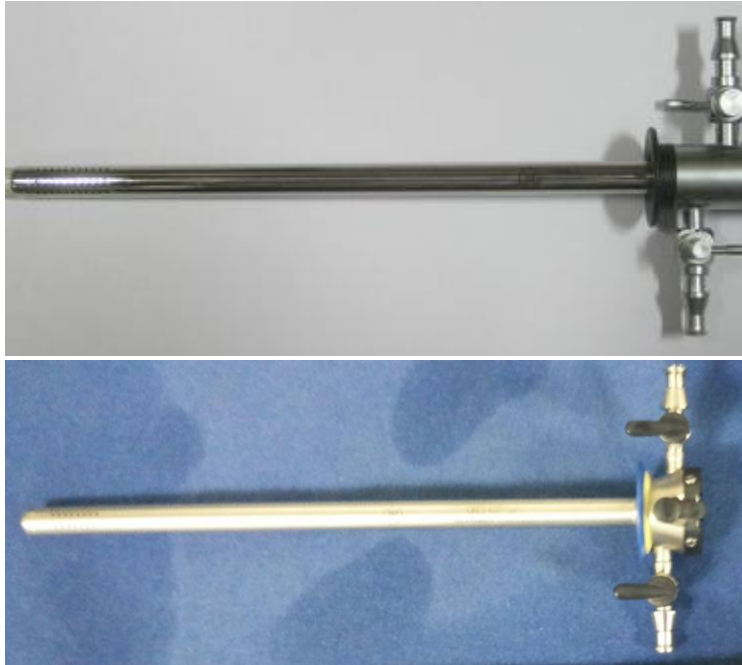
Can be used with suction

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Newer outer sheaths**

New models of outer sheath are rotating types-means when the surgeon turns the resectoscope assembly  $90^{\circ}$  towards right or left lateral lobes of prostate, the outer sheath doesnot turn along with the movement, but only the inner sheath and working element moves.

Thus the inner sheath and working element assembly rotates inside the fixed outer sheath, leading to a lesser torque on urethral wall as well as less friction. This leads to lesser chances of urethral stricture. Such outer sheaths have both water inflow and outflow channels integrated on the outer sheath proximal end.



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### **Inner Sheath:**



- For Inflow of irrigant
- 24 Fch
- Bakelite insulated tip
- Inflow (upward directed Luer lock) is coinciding to the hole is Schmidt's visual obturator.
- water or irrigant runs inside the inner sheath (between inner sheath and working element/scope) to reach into the bladder.

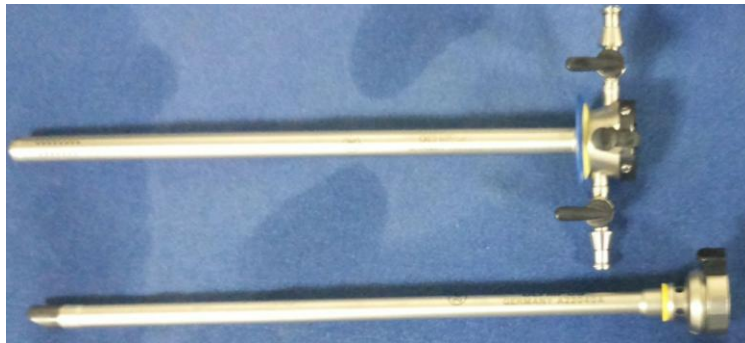
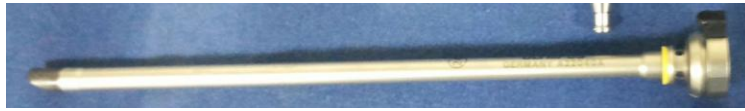


## **Neeraj Sharma's ...Notes For Urology Practicals**

- Returning water enters the fenestrated holes and runs between the outer and inner sheath to come out finally from the outlet channel at the proximal end of outer sheath

Newer inner sheaths

- Rotating types



rotating type outer and inner sheath

inner sheath has a Bakelite distal end and a rubber cuffing with hole at proximal end.  
The hole of the rubber cuffing should come in direct alignment of inflow channel of outer sheath.

Uses of Bakelite

As a current insulator

Needed for cutting chips –incoming activated loop comes upto 1 mm inside the inner sheath and the chip is detached from the main gland with the help of Bakelite

**Q: will you use a resectoscope sheath with broken Bakelite tip?**

A: no. it is dangerous as current may leak out and spread

## **Schmidt's visual obturator**



**Q: what is the main use of visual obturator & its Benefit?**

A:

- Schmidt's obturator
- Allows atraumatic introduction
- Under vision insertion
- Simultaneous irrigation inflow

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: how does water flow through the Schmidt's obturator?**

A: there is a window in the shaft of Schmidt's obturator which aligns exactly under the inflow channel of the inner sheath. When obturator is in place, water enters through the inflow channel of inner sheath and drops straight down in to the obturator window. Water now travels inside the hollow shaft of obturator to reach the bladder.

### **Parts**

#### Tip

- Smooth round tip for atraumatic insertion
- Telescope tip projects at the obturator tip

#### Shaft

- Hollow tube through which water runs around the telescope
- Proximal window for incoming water
- Male type lock with teeth to lock into the inner sheath proximal end

#### Base

- Angulated limb/Side channel for guidewire if needed
- Central arm for telescope
- Rotating female type groove lock into which fits the telescope

### **Q: What are the indn for using visual obturator?**

A:

- a. Watching institute (learning person)
- b. Large median lobe (on USG)
- c. After traumatic cystoscopy / dilation of urethra
- d. False passage

### **Q: what are the other obturators?**

A:

1. Blind obturator



2. Leusch obturator: it has got a rubber cuffing at the distal end and as the obturator is locked the rubber cuff projects out and covers the sharp edges of outer sheath.

3. Timberlake obturator → Hinged obturator for blind insertion.





**Working Element**



Parts:

Tip –

- sharp straight cut tip
- telescope comes out of the center of tip
- loop moves under the tip

shaft:

- hollow metal tube
- loop tunnel: additional hollow metal tube attached at the lower margin of main shaft through which the loop passes
- ratchet lock: at the proximal end of the shaft ,ratchet type click lock mechanism into which fit the limbs of loop
- groove type rotatory lock: for locking onto the inner sheath proximal end

Handle:

- has two arms one for four fingers and other for thumb rest
- loop unlocking knob: just near to the finger grip arm there is a press knob to release the loop from the assembly

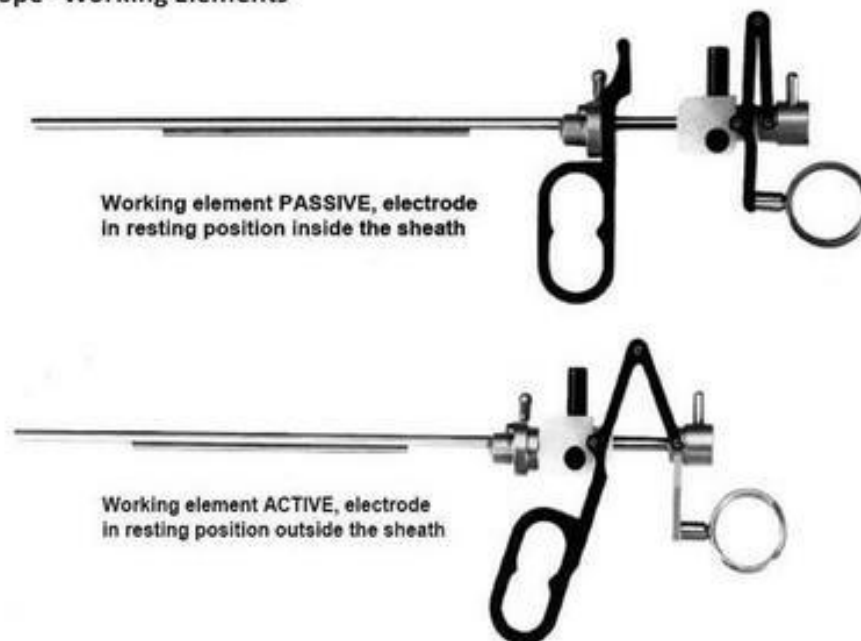
## **Neeraj Sharma's ...Notes For Urology Practicals**

- electrode groove- just proximal to the loop unlocking knob there is a groove female type into which fits the electrode end of the hifi electric current cable
- spring mechanism : joining the two arms (finger rest and thumb rest) is the spring mechanism which sends the loop back into the resting position.
- Depending upon the spring action the working element can be an active one or a passive one
- Telescope lock: proximal end is a 'female type' rotating groove into which locks the telescope

Active type :

- Also known as Baumracker type
- At rest the cutting loop remains projected outside from the distal tip
- Loop is to be actively brought inside /or cutting is actively done using the forefingers handle while the thumb handle remains stationary
- The loop is passively sent out again by spring action

### **Resectoscope - Working Elements**



Passive type:

- Also known as Nesbit type
- At rest the loop remains inside the sheath and needs a push by thumb to advance.
- the loop returns back with the help of spring action and cuts with the aid of thumb movement
- the finger rest arm remains stationary

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: how to align the TURP set in exam?**

**A:**

1. identify all the components properly –outer sheath, inner sheath, Schmidt's obturator and telescope
2. take the inner sheath in left hand and check through the hollow shaft that no particulate is there inside it
3. check the Bakelite tip with right hand
4. pick up the obturator with right hand and insert gently into the inner sheath and securely lock it
5. hold this assembly in right hand.
6. pick up the outer sheath with left hand ,check the hollow shaft for particulate matter and insert the inner sheath + obturator assembly into the outer sheath . do not try to load outer sheath over the inner sheath +obturator assembly instead push the inner sheath +obturator assembly in outer sheath .lock this assembly
7. Now insert the telescope.
8. It looks nice if you do not fumble while aligning a TURP set , try not to keep the parts back on table once picked up and until properly align in one go without keeping them back on table ,then picking up again ,then placing on table and picking up and so on .
9. Always securely lock after each step

**Q: why do you want to align the obturator first into the inner sheath?**

A: inner sheath has Bakelite at its tip which can break while introducing it directly into the outer sheath, particularly when the outer sheath is bent or has some particulates in it. So it is advisable to deploy the obturator first into the inner sheath .this makes a sturdy assembly and tip of obturator projects out of inner sheath making it safer to introduce into outer sheath.



Reck n penien type resectoscope with outer sheath (only single sheath –no inner sheath) having Bakelite.

.water flow is intermittent type

Note the blind obturator and the Timberlake obturator.

**Loops**



According to size

- 24 fch –yellow colour coded
- 27 fch-brown colour coded

According to number of limbs

- Single stem
- Double stem

Most commonly used are 24 fch double stem electrode loops



**Q: how does the current flow in a double stem loop?**





A: the two limbs of the loop are not equal

- The longer limb actually connects to the cautery electrode
- The current travels from the longer limb to the loop and cuts the prostatic chip and returns through the cautery plate placed under patient via patient 's body.
- The smaller limb is just for the support

**Q: how does the current flow in a single stem loop?**

A: the lone stem is the active limb

- The current travels from the limb to the loop and cuts the prostatic chip and returns through the cautery plate placed under patient via patient's body.
- In this single stem design the stem is sturdier so that there is no supporting limb.

<b>Cutting Loop Electrode</b>	
	<b>Roller Ball 3mm Electrode</b>
<b>Roller Ball 5mm Electrode</b>	
	<b>Collin's Knife Electrode</b>

**Q: what is the length, width and shape of a TURP chip?**

**A:**

- Length – 3 cm
- Width – 8 mm
- Shape – boat shaped

**Q: how much should the loop retract inside the sheath?**

**A:** less than 1 mm

**Q: what are the cutting loops made of?**

**A:** Tungsten

**Q: what are the sizes of thin loop & thick loop?**

**A:**

Thin loop-wire thickness- 0.25mm diameter – for TURBT

Thick loop-wire thickness -0.35mm diameter – for TURP

24 Fch – yellow, 27 Fch – Brown

**Q: can you cut or coagulate with a broken loop?**

**A:** cutting –not possible

Coagulation –possible

**Q: how will you keep the intravesical pressure low?**

**A:** continuous sheath / SPC cannula (Reuters' cannula)



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is PANSADARO's classification of post TURP stricture?**

A: Type I: only bldr. Neck

Type II : Only mid prostatic stricture

Type III: whole of the prostatic fossa is strictured

**Q: how will you differentiate b/w the post traumatic stricture & hypo contractile bldr**

A: Post TURP stricture:

- Late presentation
- Gradual slowing down of stream over months
- Multiple crest & trough in uroflow
- Trough will not touch baseline

Hypocontractile Bladder:

- Immediate presentation at catheter removal
- Early presentation
- Trough will touch baseline

**Q: what is the name of SPC cannula?**

A: Reuter's cannula

### **Ellick's evacuator**

Ellick was a resident at the University of Iowa under Alcock. According to the University website, Alcock encouraged Ellick to improve on the Davis evacuator for removing prostate chips. A glass and red rubber Ellick evacuator, designed by Milo Ellick in 1937.

Ellick MA. Modification of the evacuator. J Urol: 1937; 153: 327



At present, the most commonly used device for bladder irrigation is the Ellick evacuator. The Ellick evacuator comprises a pair of integrally formed chambers disposed in vertical alignment and having a restricted, central passageway in open communication between the two chambers. The upper chamber



is provided with two ports, one of which is adapted for connection to a manually compressible bulb, the other of which is adapted for connection to a resectoscope for insertion into the urinary bladder.

**Q: what all instruments are in the name of ELLIKS?**

A:

- ELLIK bladder evacuator
- Ellick's kidney stone basket
- Ellick's meatotome
- Ellick's Sound
- Ellick's stone dislodge

**Q: How does an Ellick's evacuator work?**

A: In use the Ellick evacuator is completely filled with a sterile irrigation fluid and the resectoscope catheter passed into the bladder. Upon compression of the bulb, the sterile liquid is forced into the bladder, and is withdrawn following release of the bulb. Tissue and other particulate matter in the withdrawn fluid, which have a specific gravity greater than that of the sterile liquid, will tend to settle through the opening between the two chambers into the lower chamber.

However, compression of the bulb produces **eddy currents** in the fluid in the upper chamber.

These eddy currents tend to cause a portion of the particulate matter to remain in suspension, with the result, that tissue and other particulate matter are reinjected into the bladder each time the bulb is compressed after the initial compression. This is particularly the case when small prostatic chips or frond-like segments of a papillary bladder tumor are present, as they tend to float in the upper chamber and do not settle into the lower chambers.

**Caultry**



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what cautery machine do you use?**

A: valleylab FORCE -FX

**Q: what are your settings for cautery?**

A:

- cutting -120
- Coagulation -70-80

**Q: what are the cutting and coagulation modes in Valleylab?**

A:

- Three cut modes
  - Low Cut for delicate tissue or laparoscopic cases
  - Pure Cut for a clean, precise cut
  - Blend for cutting with hemostasis
- Four coagulation modes:
  - Desiccate for low voltage contact coagulation suitable in laparoscopic and delicate tissue work
  - Fulgurate (high crest factor) for efficient noncontact coagulation in most applications
  - Fulgurate (low crest factor) for lower voltage coagulation requirements
  - Spray for coagulating large tissue areas with superficial depth of necrosis

**Q: What is the TURP cable known as?**

A: H.F cable high pregnancy cable

100 kilo watt. 100 kw

This cable has a hole/socket at the patient's end into which the longer limb of the cutting loop comes and fits in.

**Q: what are the uses of Collin's knife?**

A:

1. TUBNI
2. Ureterocele incision
3. Bladder diverticular neck incision
4. TUIP
5. Sphincterectomy → side effects erectile dysfunction
6. Impacted VUJn stone
7. Endopyelotomy
8. PUV fulguration

## STONE FORCEPS

### **Maur Meyer stone punch**



Components →

Outer sheath:

- 23.5 Fch, Straight, Oblong in cross section
- Intermittent flow sheath
- At the proximal end there is a knob for water inflow-outflow control
- Knob up means inflow open
- knob down means outflow open

Obturator –

- Blind obturator
- Visual Obturator –almost same as Schmidt's visual obturator

Working element: stone punch

**Tip**

- At the tip there is a downward opening space of 2cm to hook up the stone, lift from base of the bladder to centre of bladder & then crunch.
- There is sharp edged punch at the distal tip that strongly bites into the stone to crush it

**Shaft-**

- There is a solid sturdy shaft
- Telescope passes under the shaft
- There is a 1 inch tunnel for telescope to pass under the working element at the distal end of working element

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Proximal handle**

- There is a handle for thumb and fore finger at the proximal end with spring mechanism in b/w.

### **General issues about stone punch**

- As the telescope passes under the working element it is advisable to use 0° forward viewing telescope otherwise the distal end of stone punch will not be seen
- Stones which are bigger than 2 cm, that is, bigger than the size of stone punch gap cannot be broken
- Stone is broken between distal sharp edge of working element and distal end of outer sheath
- Stones which are too hard are difficult to manage
- Chances of bladder injury if bladder mucosa is entrapped in the punch

### **Alligator stone forceps**



### **Sheath-**

- 25 fch straight ,oblong (in cross section) ,intermittent type water flow with knob type control valve for water inlet or outlet
- Sheath requires a blind obturator to get introduced into the bladder

### **Working element –**

- Tip is like alligator's jaw
- Stone is crushed between the two jaws of working element
- Only the lower jaw moves, upper is fixed
- Male type groove lock proximally
- Scope passes under the shaft of working element

### **Handle**

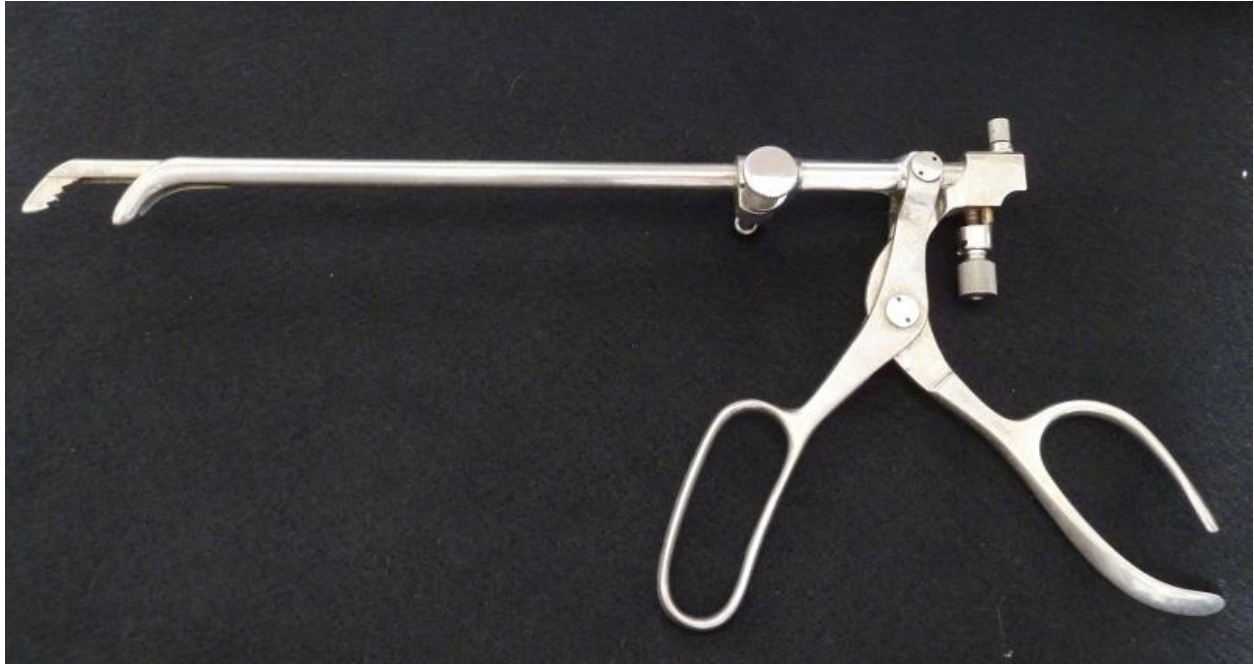
- Scissors type handle action

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **General issues about Alligator stone forceps**

- As the telescope passes under the working element it is advisable to use 30° viewing telescope otherwise the lower jaw is difficult to see
- At a time only one jaw can be seen properly
- Stones which are too hard are difficult to manage
- Chances of bladder injury if bladder mucosa is entrapped in the jaws
- The forceps can break inside the bladder

### **Hendrickson lithotrite**



### **Modified Hendrickson lithotrite**



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Hendrickson lithotrite or** Optical lithotrite

- Entry : Blind , the curved part blades are introduced in bladder almost like curved dilator fashion
- Mechanism : mechanical stone crushing Under vision
- Telescope: 70°, 30°. Telescope
- Stone size : 3 cm length
- Handle: Scissor handle.
- Dis advantage – the two jaws can stuck/ get jammed inside the bladder with stone in between the jaws making it difficult to remove the instruments

### **Modified Hendrickson lithotrite**

- There is a rotating screw lever to tighten the blades
- The blades are completely dismountable- so that if they got struck inside the bladder they are dismantled and removed one by one

### **Patankar Bridge**

it is a double barrel bridge with the two barrels running one over the other  
the upper channel is for telescope  
the lower channel is for the lithoclast

- a 25 fch standard cystoscopy sheath is introduced under vision
- the standard diagnostic bridge is removed and Patankar double barrel lithoclast bridge is introduced with telescope in the upper barrel
- The lithoclast energy probe is passed through the lower channel of Patankar Bridge and with the use of pneumatic energy the stone is broken
- Keep the bladder minimal filled to avoid wandering away of the stone
- Stone fragments are removed using Ellick's evacuator

The name comes from the designer, Frederic Basil Foley, a surgeon working in Boston, Massachusetts in the 1930s. His original design was adopted by C. R. Bard, Inc., who manufactured the first prototypes and named them in honor of the surgeon.

Foley first described the use of a self-retaining balloon catheter in 1929. His design incorporated an inflatable balloon towards the tip of the tube which could be inflated inside the bladder to retain the catheter without external taping or strapping. He demonstrated this to the American Urologists Society in 1935, and published a paper describing it in 1937. While he was still developing his catheter, a patent was issued to Paul Raiche of the Davol Rubber Company of Providence, Rhode Island in 1936. Four months later, in October 1936, Foley applied for the patent, and was awarded this after appearing before the patent office Board of Appeals. Raiche appealed this decision in court, and it was overturned, returning the patent to Raiche. A further request for a hearing made by Foley was refused, and so the patent stayed with Raiche.

The C. R. Bard Company of New Jersey started distributing the catheters, under the name of Foley catheters, from 1935; consequently, the name has remained with Foley despite the patent having remained with the Davol Company.

**Q: what are the colour codes of foley's catheter?**

Fch	Colour	Length	
8	Aquamarine [Black]	30 cm	2 way only
10	Black[Grey]	30cm	"
12	White	40 cm	"
14	Green	40 cm	"
16	Orange	40cm	"
18	Red	40cm	2 way/ 3 way
20	Yellow	40cm	"
22	Purple	40cm	"
24	Blue	40cm	"



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the material of foleys catheter?**

A: latex

Now a days most of the foleys catheters come as siliconized coated latex

**Q: what is the length of foley's catheter?**

A: 40 cm standard; except 8 & 10 (pediatric) = 30 cm

**Q: which Foleys sizes are 3 way?**

A: 18 Fch & above.

**Q: what are the other works of foley's?**

A: In addition to his work on urinary catheters, Foley also described a novel technique for treating strictures of the pelvi-ureteric junction which is known as the **Foley Operation** or the **Foley Y-plasty pyeloplasty**. He also invented a hydraulic operating table and a rotatable resectoscope and described the first artificial urethral sphincter.

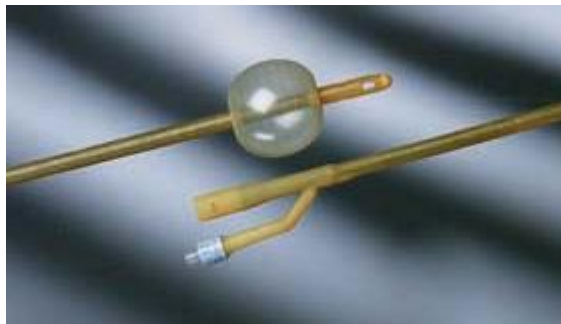
**Guyon foley catheter introducer.**

Name of foley catheter introducer – Guyon foley catheter introducer.

(reader is advised to crosscheck the name )



**Hematuria catheter**



Hematuria 2-Way Foley Catheter 22Fr/ 30cc Balloon Capacity, Hydrophilic, Long Open Coud Tip, Sterile

The shaft of the catheter is reinforced with a wound metal/nylon coil that offers significant resistance to collapse under the vacuum of irrigation. The additional strength of the coils assures users that any blockage can be cleared by irrigation. In addition, the coils add resistance to any collapse under the balloon from the pressure of inflation.





**Neeraj Sharma's-**  
**NOTES FOR UROLOGY PRACTICALS**

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**Upper tract instruments**

### **Guidewires-Principles**

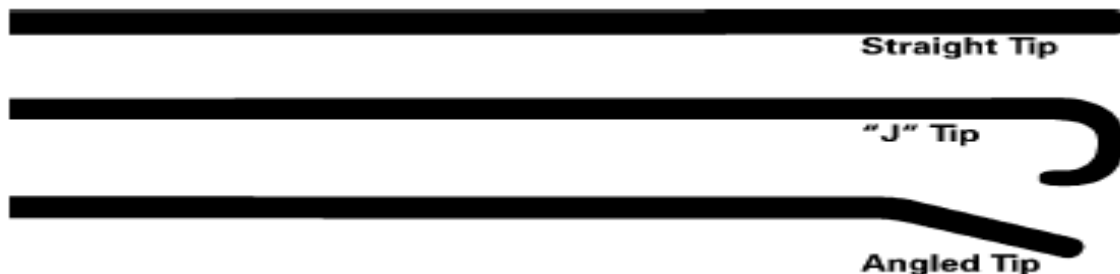
- Serve to provide access to a particular area of the urinary tract and also as a guide/track to pass catheters, stents and sheaths.
- The property varies with respect to length, diameter, composition, tip design, surface coating and shaft rigidity.
- The diameters and lengths range from 0.018 to 0.038 inch and 145 to 280cm respectively
- All guidewires are radio opaque to allow x-ray guidance to determine their position.
- Usually come pre- packaged in a coiled sheath to allow easy handling and storage.

### **Size**

- Size refers to diameter measured in inches
- Most common sizes are 0.035 inches or 2.7 Ch and 0.038 inches or 2.9 Ch.
- Smaller wires for pediatric age group eg size 0.025 inch and 70cm length

### **Tip Design**

- Straight or angled
- Straight is usually adequate for most cases
- An angled tip is useful for negotiating an impacted stone or for placing the guidewire in specific situations.
- A j-shaped tip can negotiate an impacted stone (it can suddenly flick past the stone, in a situation where a straight guidewire may inadvertently perforate the ureter and thus create a false passage) .



### **Surface Coating**

- Most guidewires are coated with PTFE – polytetrafluoroethylene which has a low coefficient of friction, thus allowing easy passage of the guidewire through the ureter and of instruments over them.
- Some coated with polymer are very slippery when wet. Some are coated just at the tip, whilst others are coated along the entire length.

### **Tip Rigidity**

- The tip of all guidewires are soft and therefore flexible, which reduces but does not completely eliminate the risk of ureteric perforation.
- Length of the floppy tip may vary, eg, 8 cm instead of 3cm tip

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Shaft Rigidity**

- Stiff guide wires are easier to manipulate than floppy ones and help to straighten a tortuous ureter.
- Very malleable wires can be very useful in bypassing an impacted stone just like the J-tipped wires.

### **Q: what are the sizes & length of G.W?**

A: Sizes 0.018 – 0.038 inch

Length 150 cm (standard) range 60-260 cm

### **Q: what are the specificities of G.W tip?**

A: *According to design:*

Straight tip – regular,

Angled tip → for difficult 11.0

'J' tip → for other tortuous ureter, for PCNL

*According to flexibility of tip*

Regular: distal '3'cm flexible

Bentson: distal 15 cm flexible

### **Q: what is the mandrel?**

A: Mandrel means Axle / Axis

Usually represents a solid bar around which something is moulded

### **Q: what are the components of Guide wire?**

A: Mandrel → central metal rod

Spring → Lightly woven spring around mandrel

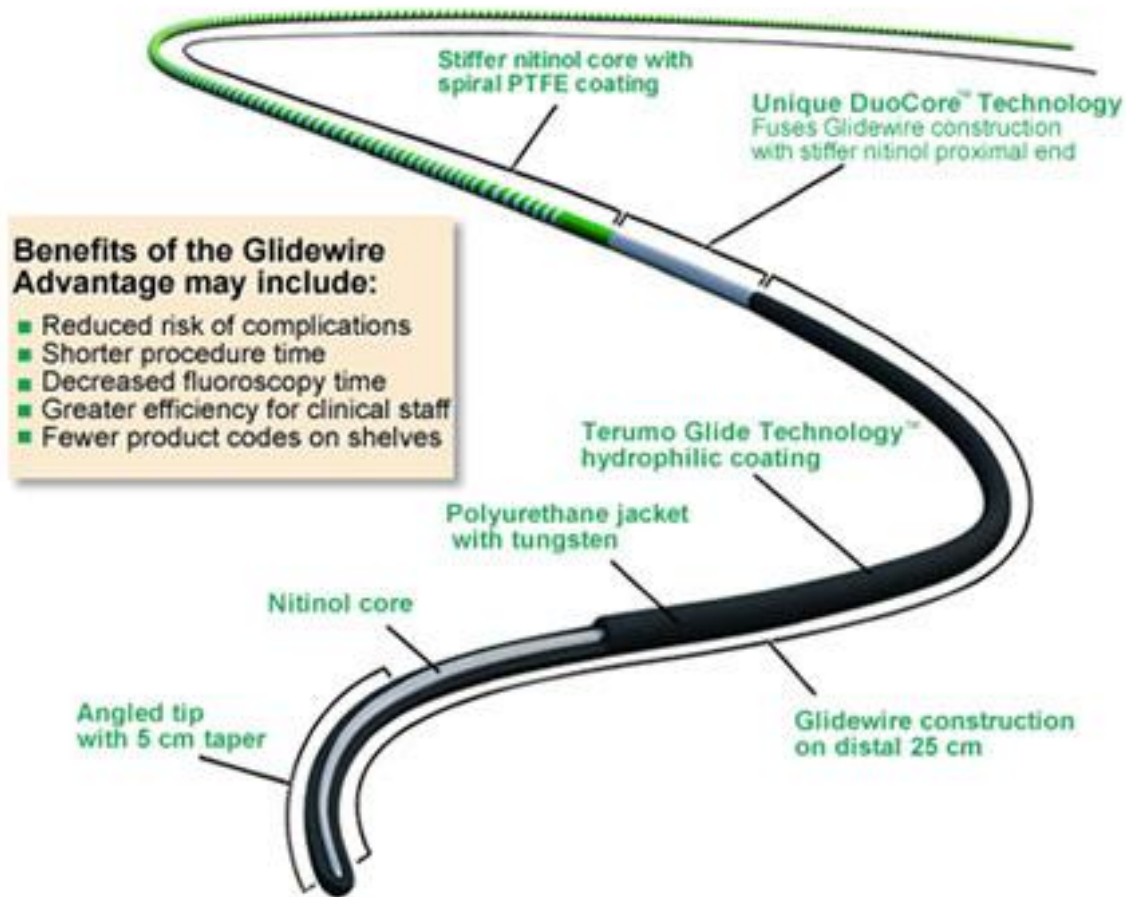
Coating → hydrophilic or regular

### **Q: Describe the components of Terumo & zebra?**

A:

	Terumo	Zebra
Other name	Glide wire	Stiff wire
Mandrel	Nitinol-nickel,-Titanium	Nitinol (initial zebra wires had stainless steel core)
Spring	Teflon=PTFE	Stainless steel
Covering coat	Polyurethane with Hydrophilic co-polymer	PTFE
Radio-opacity	Complete radio-opaque	Distal 4 cm opaque Then 4 cm radio lucent Rest complete opaque

Terumo glidewire



Terumo's tip



## **Neeraj Sharma's ...Notes For Urology Practicals**

- Excellent for maneuvering in a tortuous or kinked ureter and around an impacted ureteral calculus but often lack sufficient rigidity for the passage of catheters and stents and may migrate out of the ureter during manipulation.

- The Nitinol core allows maximal deflection without kinking, while the tungsten ensures high visualization during fluoroscopy.
- Coating is a micro thin layer of hydrophilic polymer that, when activated, attracts and holds water and other liquids to the guidewire, creating a low-friction surface

**Q: what makes the Terumo radio-opaque?**

A: tungsten

---

### ***Zebra stiff wire***

#### **Distinct Construction**

- Kink-resistant Nitinol core
- Flexible PTFE "jacket" designed for torqueability

#### **Enhanced Visualization**

- Blue and white striped pattern is designed to provide clear endoscopic visualization of wire movement
- Platinum distal tip is visible under fluoroscopy to aid in confirmation of guidewire position

#### **Lubricious Coating**

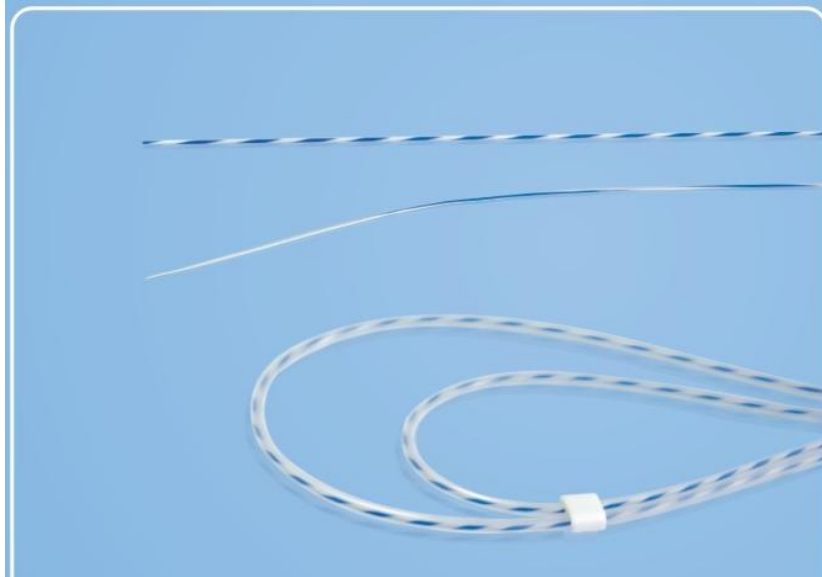
- Uro-Glide™ Coating on distal 60cm designed to reduce surface friction for smooth entry, advancement and withdrawal with precise proximal handling

#### **Accessories Supplied**

- Torque Vise is packaged with the product and offers the physician fingertip torque control required to negotiate difficult anatomy and gain access beyond impacted calculi

#### **Latex Information**

This product contains no detectable latex.

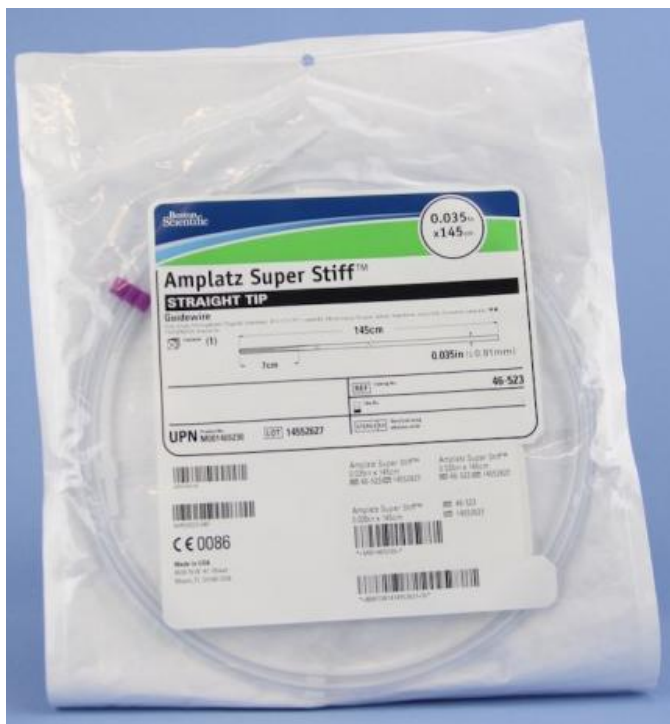


**Q: What are the examples of stiff guide wires?**

**A:**

- Lunderquist guidewire
- Amplatz super stiff

Amplatz superstiff guidewire is nothing but like an Amplatz stiff guide rod with two differences .one the shaft is narrow and seconds the distal tip 5 cm is floppy



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: What is fixed core & movable core guidewires?**

A: If spring is welded (fixed) to mandrel → fixed

If spring is not welded to mandrel → Movable guide wires.

---

### **Retrograde ureteric Catheter RGC**

**Q: what is the other name?**

A: Retrograde catheter RGC

**Q: what is RGC made up of?**

A: Polyurethane

**Q: what is the length & dimensions of RGC?**

A: 70 cm length (Roughly equal to Flexiureterscope)

Size → 3-8 Fch

3, 4 fch RGC takes up = 0.028 guidewire

5,6,7,8 fch = 0.0035 Guidewire.

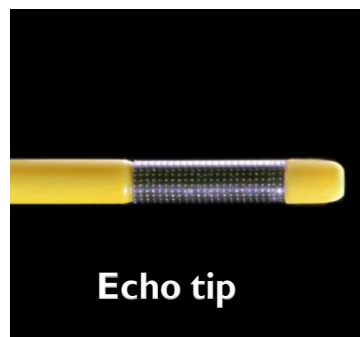
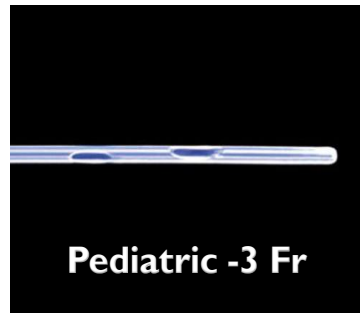
**Q: what are the types of RGC tips?**

A:

- open ended
- Close ended
- Round tip
- Olive tip
- Conical tip
- Bulb tip
- Whistle tip







**Q: what are the uses of RGC catheter?**

**A:**

1. For Bulb ureterogram
2. for RGP – Before PCNL
  - Before stenting
  - Urine sampling from ureters.
3. for exchange of wires/ Guidewires
4. Tract securing before endopyelotomy.

**New packed RGC catheter comes with a metal stylet and white coloured connector.**

---

**STONE BASKETS**

**Q: what is Nitinol?**

A:

- NITINOL derived from the composition and place of its discovery :

**NICKEL Titanium Naval Ordinance Laboratory**

- A metal alloy of nickel and titanium, and both elements are present in equal atomic percentages
- Material of choice for applications requiring enormous amount of flexibility and motion, and is the most superior shape memory metal available

**Q: what are the components of stone baskets?**

A:

Tip:

- Far most distal end
- Helps in introduction into side channel of uretero scope
- Leading cause of perforation
- Makes use difficult in calyces
- Tipless baskets are now available

Basket proper

- Made up of four or more wires
- Helical basket, non helical basket

Shaft

- Long wired attachment between basket & handle

Sheath

- Covers the shaft (sheath type- detachable)

Handle

- For opening & closing of basket detachable from shaft.
- Handle type-detachable

**Q: what is 'basket' made up of?**

A: stainless steel (old version)

Nitinol (new)

Stainless steel:

- Better ureteral distention
- Less flexible

Nitinol

- Less ureteric distension
- More flexible
- Less caliber so better irrigation
- Better visualization
- Decreases the 'flexi-ureter' deflection by  $10^0$

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the sizes of Basket system?**

A:

Width max at open basket = 2cm

Length: 90 cm – 120 cm

Shaft size; 2.2 – 3.2 Fch

**Q: what is “Bare-naked Basket”?**

A:

- When baskets are used without the sheath covering shaft
- Improves irrigation, vision & Bending.

**Q: what are the chief basket designs?**

A:

Non- Helical (Segura) (flat Baskets)

Helical Basket

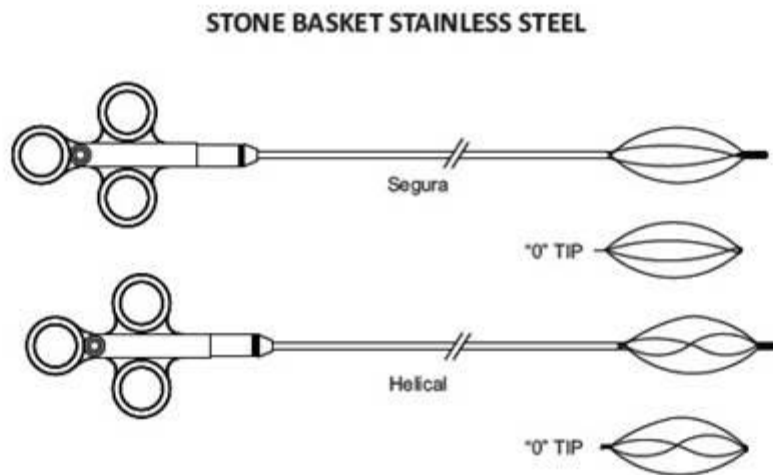
- Expands ureter firmly
- Multiple stone retrieval
- Best for small stones



Segura baskets

- Less firm expansion
- Best for large stone





**Q: what are the designs according to basket tips?**

A: with tip – 1-2 cm

Tip – 'N' circle Baskets

Tip-Baskets → Usually stainless steel

→ For lower/mid ureteric stones

→ Tip acts as 2<sup>nd</sup>/safety guide wire

Tipless Baskets; - 'N' circle Baskets

- for calyceal stones

Filliform tip – 5cm tip



**Q: what is a laser basket?**

A: contains central hollow shaft, so that a laser fibre 200µ can pass through & Break a stone

**Q: what else can be the use of Segura basket?**

A: Biopsy of upper tract tumour

**Q: What are the typical advantages of tipless baskets?**

A: - "spring" action of basket wire leads to easy dis-entanglement of stone if struck.

- Nitinol wire causes easy maneuverability.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: How will you cut entrapped Basket?**

A: Holmium laser

- Dismantle the basket handle and remove scope; re-introduce the ureterscope along side the basket shaft and cut the basket.
- Convert to open if needed

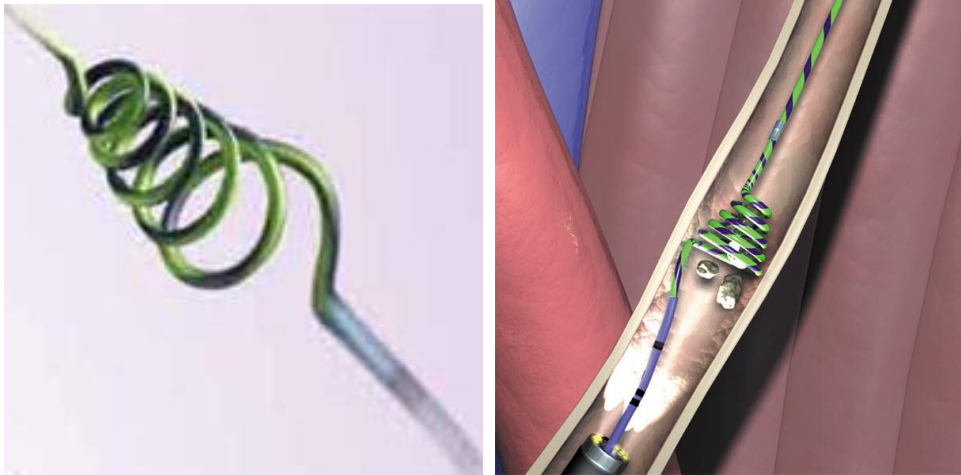
### **Q: What is stone cone?**

A: Modified Nitinol guidewire

With coiled 'memory'

Pass the tip of (ureterscope/RGC) beyond stone and deploy the stone cone

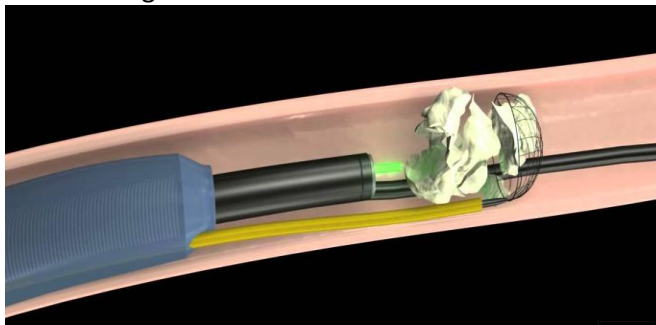
On release the wire coils in concentric ring loops diameter 7mm or 9mm prevents proximal migration of stone / fragments.



### **Q: what are the other ways of preventing stone proximal migration?**

A:

1. N-Trap – tightly woven Nitinol mesh net
2. Accordion – nylon & stainless steel guidewire with polyurethane film-forms the bottle brush
3. Lignocaine jelly
4. Urogel



N-Trap Nitinol mesh

### **Q: How does Urogel function?**

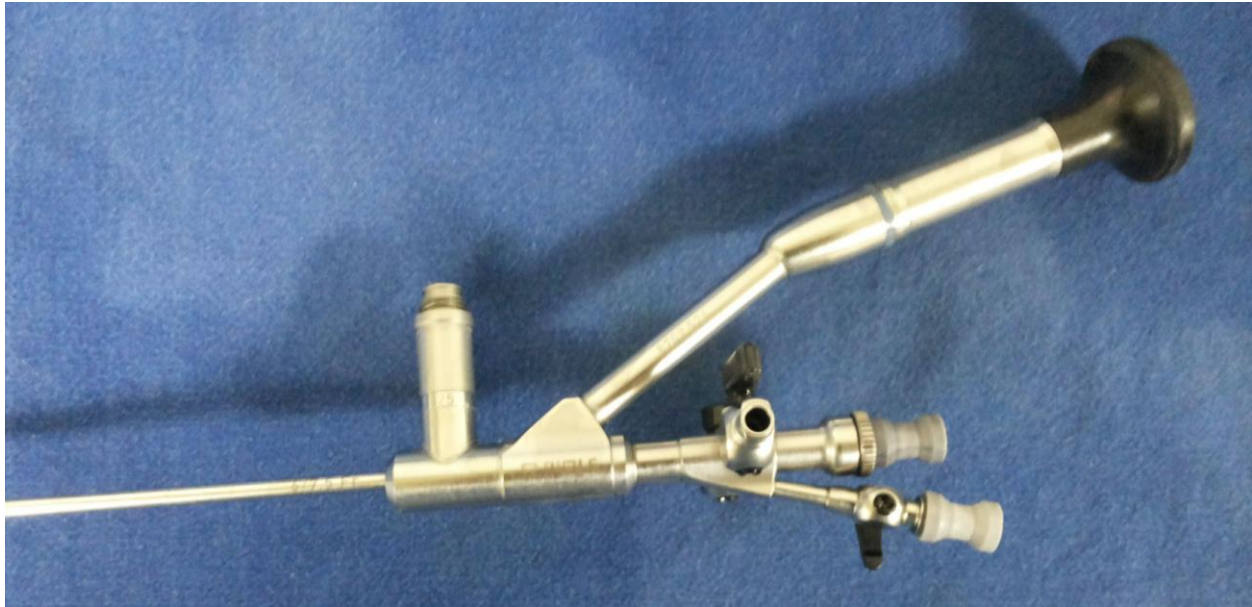
A:

- Urogel is solid at body temp & liquid at cold temp.
- Injected through RGC Catheter and solidifies proximal to stone
- After URSL; irrigate with cold saline and dissolve it.

**SEMI-RIGID URETEROSCOPE (SR-URS)**

**Q: who are the fore-runner manufacturers of S.R URS?**

A:, KARL- storz, wolf, Olympus ,ACMI



**Q: What are the components of SR-URS?**

A:

1. TIP – Beveled / Beaked / Flat
2. Shaft – Gradual tapering / stepwise tapering
  - step less (wolf, Olympus) gradual smooth tapering
  - Presently all are stepless.
3. Eye piece – straight /angled/offset
4. Working channels – one/two
5. Integrated Light Pillar.

**Q: what are the sizes of SR-URS?**

**A:**

- 4 fch –slender ureteroscope
- 6- 7.5 fch-regular URS -- 6 fch is the tip and 7.5 fch is the base of shaft
- 8- 9.8 fch –large URS -- 8 fch is the tip and 9.8 fch is the base of shaft
- This tapering/ widening of the shaft diameter may be step wise or as gradual smoothened one
- Most scopes presently are gradual smoothened ones

**Q: How is the tip of SR-URS?**

A: usually beaked tip- small rounded beak at 12 o'clock

Recently beveled tip.



**Q: Describe the optical system of URS?**

**A:**

Initially: - Rod lens system

Presently: - fibre optic system

Rod lens

- Excellent vision
- Angulation of eyepiece not feasible
- If angled leads to crescentric dark area

Fibre optic

- Leads to 'graining' effect
- Feasible
- No dark areas

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the adv of offset lens / angled lens?**

A: Straight path available for lithoclast  
Otherwise lithoclast probe has to bend



**Q: what is the angle of view?**

A:  $5-12^{\circ}$

- ACMI- $5^{\circ}$
- Olympus -  $7^{\circ}$
- Karl storz -  $8^{\circ}$
- Wolf –  $12^{\circ}$

**Q: what are the working channels sizes?**

A:

- Karl storz: Usually single channel = 5.5 Fch
- Wolf → channel = 1 x 5, or 2 x 3 F
- Olympus → single channel 1 x 4.2 Fch, or double channel = 2.4 + 3.4 Fch

In general range = 2.2 – 6.6 Fch

**One channel of atleast 3.4 Fch , 2<sup>nd</sup> usually 2.4 Fch.**

**Q: what is the length of SR-URS?**

A: 43 cm

**Q: How will you sterile SR-URS?**

A: Autoclave

**Q: What are the advantages of two working channels?**

A: Larger one for rigid instrumentation

Smaller one for irrigation

Vision } is maintained

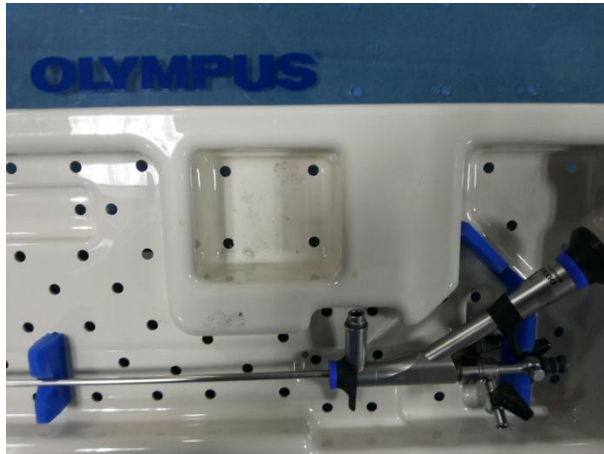


## **Neeraj Sharma's ...Notes For Urology Practicals**

Irrigation

**Q: why there is an angle of view?**

A: to see as the instrument /guidewire/ lithoclast emerges out of sheath; thus reducing trauma.



**FLEXI-URETEROSCOPE**



**Q: What are the indn of RIRS/flexi URS**

A:

- Management of nephrolithiasis-small stones
  - Evaluation & Mx of Lateralizing hematuria
  - Urine Cytology
  - Biopsy
  - Fulguration
  - Surveillance/ Fl/up of upper Tract TCC.
  - Evaluation of ureteric obstn., stricture
- } of upper tract pathology.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the major manufactures of flexi URS**

A: ACMI, Olympus, Wolf, Karl-storz.

**Q: what are the measurements of flexi – ureteroscope?**

A:

- Tip → 6 – 8 FCH (variable as per manufacture)
- Shaft → 8-10 Fch (variable as per manufacture)
- Access sheath → 10 -12 FCH
- Working channel → 3.6 Fch (standard for all)
- Working length → 65-70 cm std [= length of RGC]
- Field of view → 80-90<sup>0</sup>

**Q: describe the fibre optics of flexi-URS?**

A:

- 2-3 fibre optic bundles
- 1-2 may be used for illumination
- One for image transportation
- Haphazardly arranged (non Coherent)
- End to end arranged (coherent arranged)

**Q: what is active deflection & passive deflection?**

A:

Active deflection refers to the deflection of the tip of the endoscope,

- Actively controlled by endoscopist.

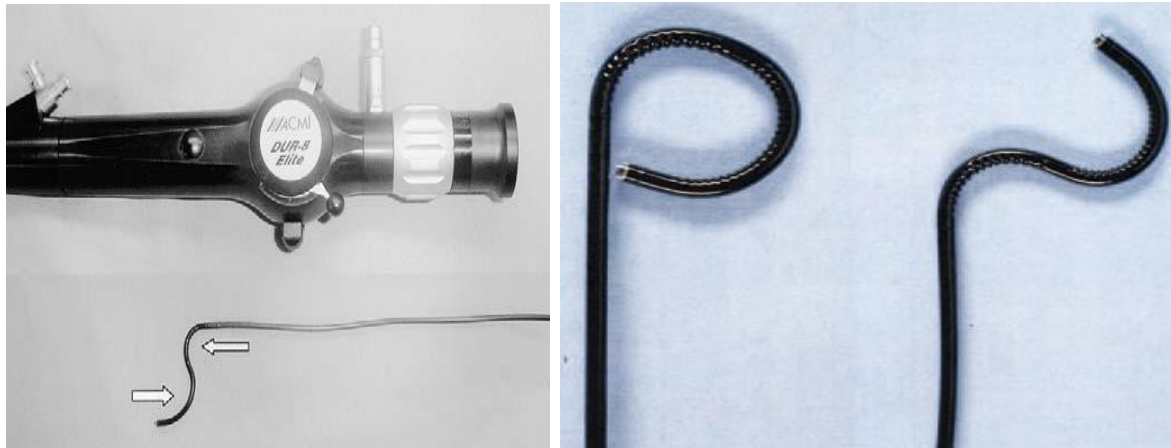
Passive deflection –

- Only in ACMI DUR-8 scope
- ACMI company is now closed.
- (ACMI company was taken over by Gyrus, and Gyrus taken over by Olympus)
- Movement of the flexible Segment several centimeters proximal to tip.

Newer scopes have two segment of active deflection

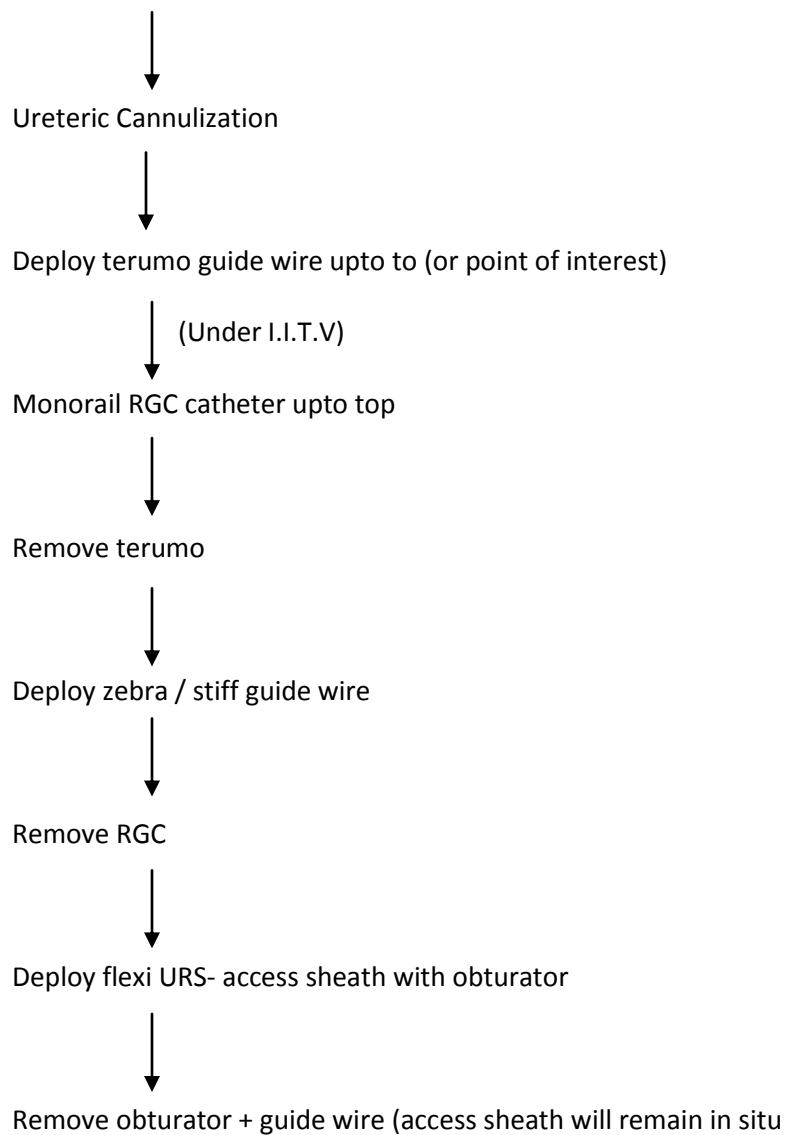
Active deflection is usually 180<sup>0</sup> up to down only (same plane)

- Passive deflection is usually 130<sup>0</sup> down only.
- Karl storz has 270 active deflections in either direction.



**Q: How will you deploy ureteric access sheath?**

**A: Cystoscope**





**Q: Describe the handle of Flex-X2?**

**A:**

- Distal tip of handle is merged with shaft
- There is a common side channel which receives accessory in the straight limb and water inflow in the perpendicular arm
- Single lever for deflecting shaft in up and down motions only in a single plane
- Light cable attachment on the rounded part of the body
- Pressure channel with cap just next to light port
- Eye piece lens with mountable camera type



**Q: when will you put the cap on pressure channel and when not?**

**A:** put the cap on pressure channel when doing

- Gas sterilization
- Shipping
- aviation

Remove cap before

- Immersing in liquid sterilizers
- Cleaning process

## Neeraj Sharma's ...Notes For Urology Practicals

	Flex X 2 specifications	
Working Length	67 cm	
Diameter at tip	7.5 fch	
Shaft size	7.5 fch	
Direction of view	0°	
field of view	88°	
Control lever	Single	
Torque	1:1 torque	
Deflection	270° up	270° down
Max Deflection with laser	270° up /down with 200 µ laser	250° up/down with 365 µ laser
Deflection type	Positive deflection	Counter positive also available
Working channel diameter	3.6 fch	
Grasping forceps	3 fch length 100 cm	With double action jaws
Biopsy forceps	3 fch length 100 cm	With double action jaws
Caultry electrode	3 fch length 110 cm	unipolar



**Q: what are the parts of access sheath?**

**A:**

1. Obturator with distal tapered edge
2. Sheath proper (Hydrophilic coated)
3. Proximal funnel.

## **Neeraj Sharma's ...Notes For Urology Practicals**

Obturator has a

1. Luer lock mechanism at proximal end for accepting syringe for doing RGP
2. proximal ratcheted lock for sheath's funnel

**Q: what are the sizes of access sheath?**

A:

- 9-18 Fch outer diameter sheath
- 20-55 cm length
- Most commonly used assess sheath of 12/14 Fch or 10/12 Fch access sheath.

**Q: what are the indications for using access sheath?**

A:

- URS requiring multiple insertion
- Along with PCNL; for assessing system in prone position of patient.

**Q: What are the complications of using access sheath?**

A:

- Buckling of sheath in bladder during insertion
- Kinking after removal of obturator.
- Ureteral ischemic stenosis, ischemia, necrosis
- Need to place ureteric DJ stent if access sheath is used.

**Q: Is it necessary to deploy DJ stent if ureteric assess sheath is used**

A: yes, (Rapoport et al)

**Q: what are the advantages of ureteric access sheath?**

A:

- Hydrophilic coated sheath tapered dilator glides easily through the urethra into the ureteral orifice to establish a conduit for atraumatic passage of endoscopes and retrieval devices.
- 24 cm, 38 cm and 54 cm to accommodate access to the entire ureter -- intramural, distal, mid and proximal
- Facilitates rapid, repeated, and atraumatic access to the upper tracts
- Avoids back-loading over a superstiff guidewire, which may incur costly damage to the ureteroscope.
- Reduces overall costs and decreases operative times.
- Optimizes irrigant flow to improve the surgeon's endoscopic vision while minimizing the intrarenal pressures that the kidney must tolerate.

**PCNL Dilators**

**Q: what was the historical method of dilating PCNL tract?**

A: Gradual dilation using telescopic dilators (Alken) over 8 days.

**Q: who described acute dilation of PCNL Tract?**

A: Castaneda – Zuniga

**Q: What are the types of dilators you know?**

A:

Progressive fascial dilators (Amplatz)

Metal co-axial dilators (Alkens)

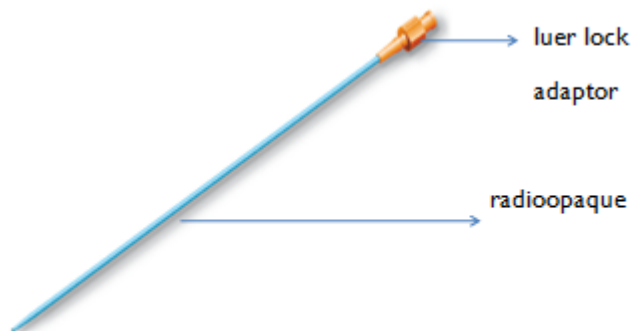
High pressure balloon dilators

**Q: Describe Amplatz dilators set?**

A:

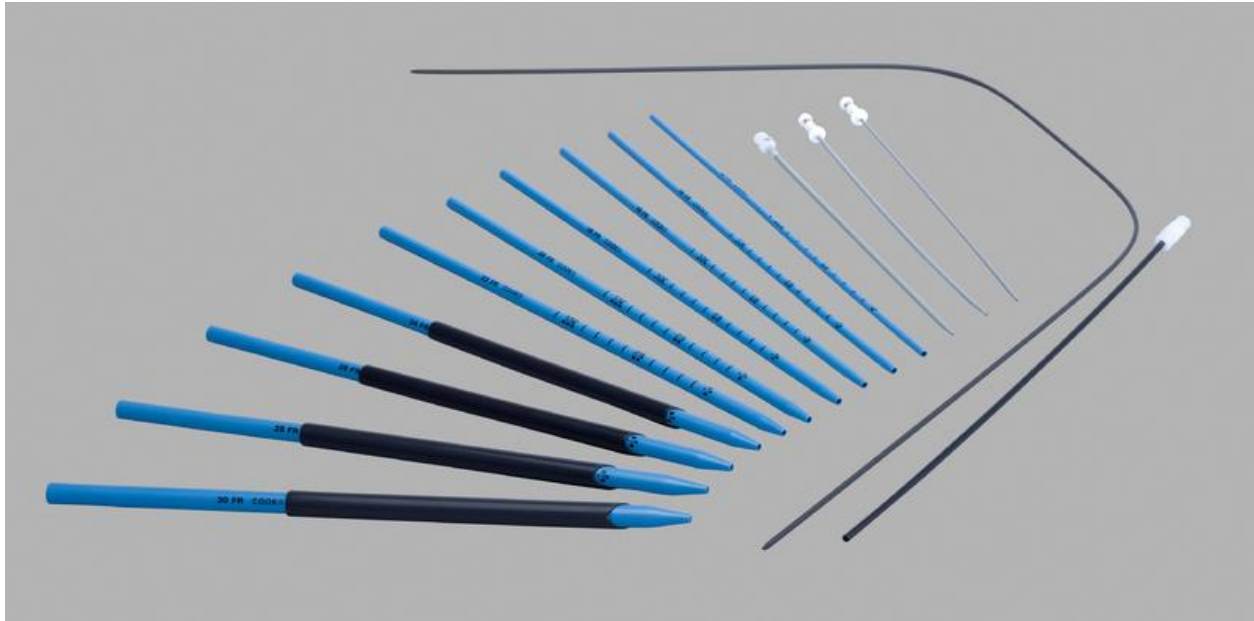
- 8 Fch Radio-opaque PTFE catheter (snake catheter)
- 3 radio opaque dilators – 6,8,10 Fch,

-all tapered to fir 0.035 G/W



- 10 dilators 12,14,16,18,20,22,24,26,28,30
- Amplatz sheath only with 24,26,28,30
- With the advent of mini perc, Now a days Amplatz sheaths are available in almost all sizes

## **Neeraj Sharma's ...Notes For Urology Practicals**



**Q: what is the increment b/w two Amplatz dilators?**

A: 2 Fch

**Q: what is the length of Amplatz dilators?**

A: 30 cm,

Dilators have cm gradations with specially notified 5cm , 10cm, 15cm



**Q: How will you insert snake catheter/ central rod?**

A: needle → Glidewire → 6 Fch → 8 Fch- → snake catheter (we use metal guide rod instead)

**Q: How will you insert rest of the dilators?**

A: over G/W + snake dilator combo

Over guidewire + central rod combo

Sequentially / rotatory movements.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the disadvantages of Amplatz dilators?**

A: repeated shear trauma in renal parenchyma and PCS perforation

- Hemorrhage
  - Extravasation
  - Over dilation
  - Under dilation
- } irregularities the leading edge of Amplatz dilator

Trauma due to

**Q: what is a screw dilator?**

A: dilator with the tip in the form of screw.



**Q: Describe the Amplatz sheath?**

A:

- Paired with 24,26,28,30 Amplatz dilators
- Length 17 cm
- One end Beveled
- Made up of Teflon
- With the advent of mini perc, Now a days Amplatz sheaths are available in almost all sizes



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the advantages of Amplatz sheath?**

A:

- Maintains the tract all the time
- Tamponade
- Blocks & Traps the stone
- Direct removal of stone without breaking (up to 1cm)
- Allows multiple passes of scope
- Nephrostomy drain tube placement.

**Q: what are the methods of doing initial procedure?**

A:

- Bull's eye
- Triangulation Technique.

### **ALKEN DILATORS**

**Q: what is the type of Alken dilators?**

A: metal-Co-axial dilators



**Q: what are the components of Alken set?**

A:

- 8 Fch hollow metal rod-guide rod
- 8 metal tubes + Amplatz sheath 30 no.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Describe the guide rod / central Rod?**

A:

- 8 Fch, bulb at distal end
- Doesnot allow dilators to move forward
- 58 cm length
- Central rod in deployed over G.W



**Q: Describe the metal tubes?**

A:

8 metal tubes

9,12, 15,18,21,24,27,30 Fch

Distal tip – Converging tip

- Exactly fits the previous dilators.
- Distally all dilators are in same plane

Proximal End = Screw / Grooves

=for grip

=no graduation marking on

dilator

=Only Fch size & company

mentioned.

Amplatz sheath is threaded over last Alken dilator and all Alken dilators removed → Introduce nephroscope.

**Q: what are the adv & disadv of Alken dilators?**

A: Adv:

1. Good for pts with previous Surgery ,
2. Peri-renal fibrosis
3. Re-usable
4. When wire access is precarious, for eg. When it is clubbed in calyx over stone.

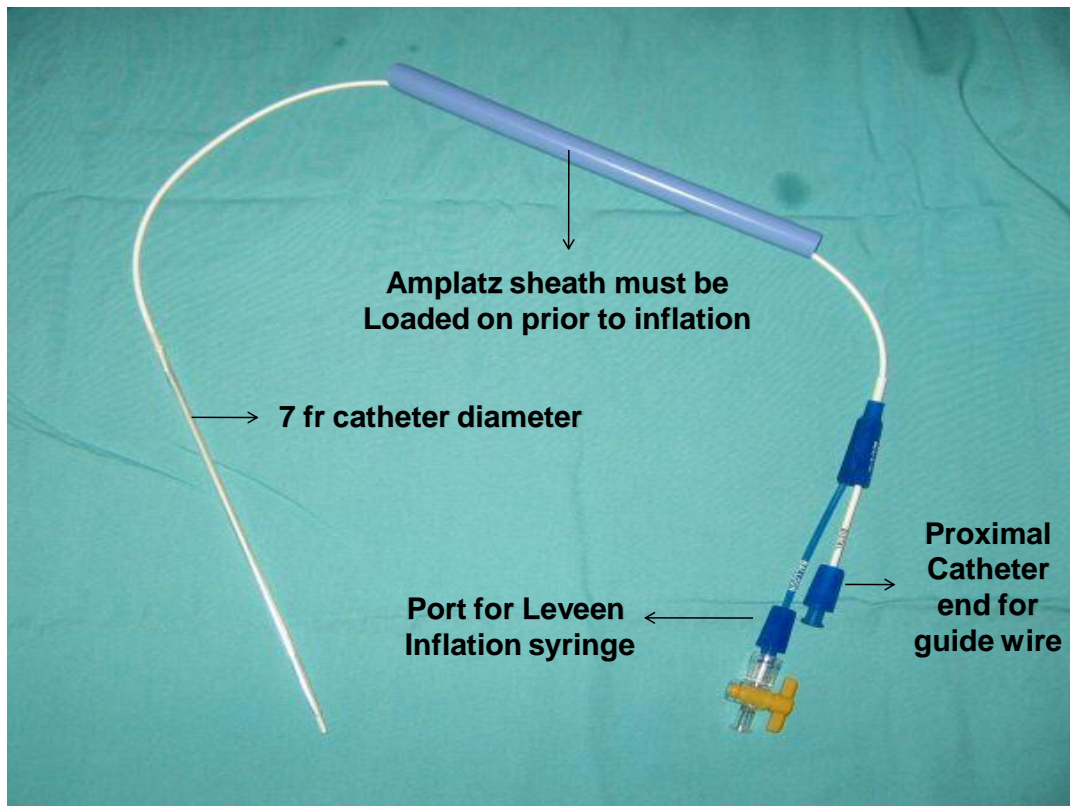
Dis adv:

1. Difficult to control pressure exerted during dilation
2. Metal rod can counter perforate PC system.

**Q: Describe the components of balloon dilator set?**

**A:**

- Initial puncture needle
- Guide wire
- 7 Fch catheter diameter (central catheter) with Radio opaque tip.
- 30 Fch Amplatz sheath already Back loaded over central catheter
- Proximal Bifid end
  - One channel for Guidewire
  - Second channel for Leveen syringe
- Piston of Leveen syringe is not a pushing type but had screwing rotator movements.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the best method of tract dilation?**

A: Balloon catheter

- Minimal Bleeding
- Single step dilation
- For the fascial, malleable and metal coaxial dilation systems, the major risk of injury results from the uncontrolled repetitive passage of progressively larger dilators.
- Balloon dilation catheters provide nephrostomy tract dilation in a single step.
- Before inserting the balloon dilator, the 30 Fr. Polyteflon working sheath is back loaded behind the un-inflated balloon.
- The catheter is then inserted over the guidewire until the inflatable segment traverses the nephrostomy tract.
- The tip of the balloon, indicated by the radiographic marker is inserted just inside the calyx.

**Q: Upto what level will the tip of balloon catheter inserted?**

A: up to calyx not beyond Calyx.

**Q: What is the pressure required to dilate the tract?**

A: 4-5 atmospheres for 'virgin' kidney

**Q: where will the "waist" appears?**

A: at renal capsule or renal scar.

**Nephroscopes**

- *There are so many models from each company*
- *Prototype models are described here*

**Q: what are the components of nephroscope?**

**A:**

1. Outer sheath (24 F) with outflow Luer locks.
2. Scope proper (20 Fr) shaft  
    With integrated light source pillar  
    With integrated offset eyepiece.
3. Obturator
4. Bridge (for Olympus)

**Q: Describe Olympus nephroscope irrigation system**

**A:** shaft 22 Fch, hollow, integrated with light source port & offset eye piece

- Outer sheath 24 Fch has both inflow & out flow channels.
- In some scope outer sheath has outflow channel, and inflow is integrated with main scope shaft.
- There is a hole in proximal end of nephroscope shaft which coincides with the inflow channel (same as in Schmidt's obturator sheath)
- Lithoclast passes through the same channel, as of water, inside nephroscope shaft.
- Water exists through the small holes in outer sheath, travels b/w nephroscope shaft & sheath and then exists, through outlet in sheath.
- If outer sheath is not used then Amplatz sheath acts as the outer sheath.(But bridge is required for inlet (inflow) in case of Olympus)



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: Describe in general the dimension of nephroscope?**

A:

	Olympus	wolf
Outer Sheath	24 Fch	22 fch
Shaft	22 Fch	20 fch
Length	20 cm	20 cm
Working channel	4mm = 12 Fch	4 mm=12 fch
lens	angled	Offset
Angle of view	10 <sup>0</sup> tilt downwards	10 <sup>0</sup>

**Q: what is a slender nephroscope?**

A: It's a narrow body nephroscope

With outer sheath 22 Fch

Inner shaft 20 Fch

Working length 20 cm

**Q: what is the difference b/w Karl storz & Olympus nephroscope?**

A:

- Karl –storz has an integrated inflow channel
- Out flow channel is in the outer sheath.

Olympus has no integrated side channel and inflow/outflow are with outer sheath or with a separate Bridge.



**STORZ nephroscope**



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How does storz nephroscope differs from Olympus?**

A: Storz has an integrated inflow channel on scope

Storz outflow channel is on sheath

Light pillar is mounted on the opposite/same side of water channel

Olympus has an ipsilaterally mounted light pillar with no water channel.

Water inflow & outflow are on sheath / bridge.



**Olympus Nephroscope Bridge**

**Q: what is the size of working channel of standard nephroscope?**

A: 12 Fch = 4mm

**Q: what is the angle of view (tilt of lens?)**

A: Nephroscope:  $10^{\circ}$

Ureteroscope:  $5-12^{\circ}$

**Q: what are the specifications of PCNL stone grasping forceps?**

A:

Length: 36 cm

Size: 6,9,12 Fch

Handle: 'U' handle with spring

Tip: 2 prong / 3 prong/ flat jaw/ toothed.



## Stone grasping forceps for PCNL



**Alligator jaw**



**Peanut jaw**

6,9,12 Fr. 360 mm



**U handle flat jaw PCNL forceps**



**Flexible Cystoscope**

**Q: describe the specifications of flexi cystoscope?**

**A:**

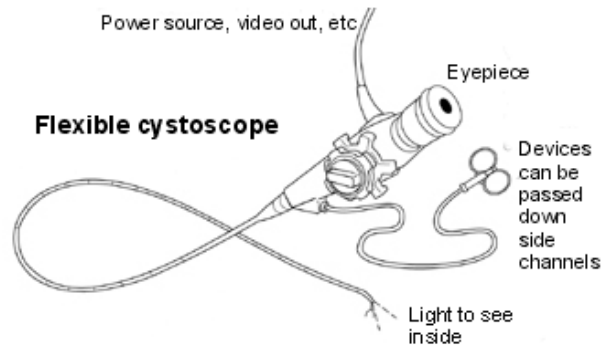
Length = 37cm

Distal tip: 11-13 Fch

Shaft: 15-17 Fch

Moving channel: 3 Fch

Angulation: 220° up, 110°-down.



**Q: what is endosheath disposable system?**

**A:**

- It is high quality plastic sheath used to cover the shaft
- Avoids cross contamination.
- Impervious to microbes & virus
- Eliminates long interval of sterilization b/w subsequent scopies.



**Q: what are the indications of flexi-cystoscopy?**

**A: Diagnostic**

- Office cystoscopy for Ca-Bladder
- Evaluation of LUTS
- Hematuria
- Evaluation of Urological fistulas
- Retrieval of samples – cytological
- FI/up of Ca-Bldr, Ca-Urethra.
- FI/up after ileal conduit, Neobladder.

**Therapeutics**

- Biopsy
- Fulguration
- Mx of urethral stricture
- Mx of Bladder Stones



**Q: who introduced DJ stent?**

A: Finney 1978.

**Q: what are the materials used for stents**

A:

- Polyurethane
- Silicone
- hybrid - C-Flex , Silitek, Percuflex , Tecoflex
- metallic SJ stents

**Q: what are the standard specifications of stents?**

A:

Size	Length	G/W
3,3.5 Fch	16-26 cm	0.018"
4,4.5 Fch	16-26 cm	0.025"
5,5.5	16-26 cm	0.035"
6, 6.5 , 7.0 fch	16-26 cm	0.038"

**Q: what are types of stents according to "ends"?**

A: Open ended

Closed ended

**Q: What is the most common stent used?**

A: 5/24, 5/26

**Q: what are long stents?**

A: 28 cm, 30 cm, 32 cm stents

For tall persons

For tortuous ureters

**Q: what are the markings on the stent?**

A: 0,5,10,15,20,25 cm

**Q: what are the qualities of stent?**

A. Material strength – Polyurethane → strong

-Silicon → weak

B. Inner/Outer Diameter ratio

Polyurethane –high

-large lumen

## **Neeraj Sharma's ...Notes For Urology Practicals**

- easily permits Guidewire
- Large side holes

Hybrid stents Percuflex have high ID/OD ratio  
Silicon stents have less inner/outer ratio

- c. Compressibility → polyurethane –less compressible  
→Silicon – compressible

- d. Coil strength: →Polyurethane –high

→Silicon – weak

- e. Surface friction →lower the better, hydrogel coating decreases the surface friction

→ Polyurethane –high friction,

Silicon –less friction

- f. Biocompatibility: The degree to which a stent affects the urothelium.  
-C.Flex, silicon are most biocompatible.

### **Q: How do we make stent radio-opaque?**

A: By in co-operation of radio-opaque salts Barium/Bismuth.

### **Q: what are the indn of stenting?**

A:

- Anastomosis healing
- Stricture healing
- Passive dilation of ureter
- Stone management
- Post PCNL
- Obstructive uropathy – malignancy, -Stone, - TB, - Stricture, radiation.

### **Q: What are the complications of stenting?**

A:

1. Stent removal (a separate procedure)
2. Forgotten stent
3. Stent encrustation
4. Biofilm & infn
5. Stent slipping / migration
6. Stent related LUTS
7. Urinary Reflux
8. Urothelial reaction.

**Q: How can you prevent stent related LUTS?**

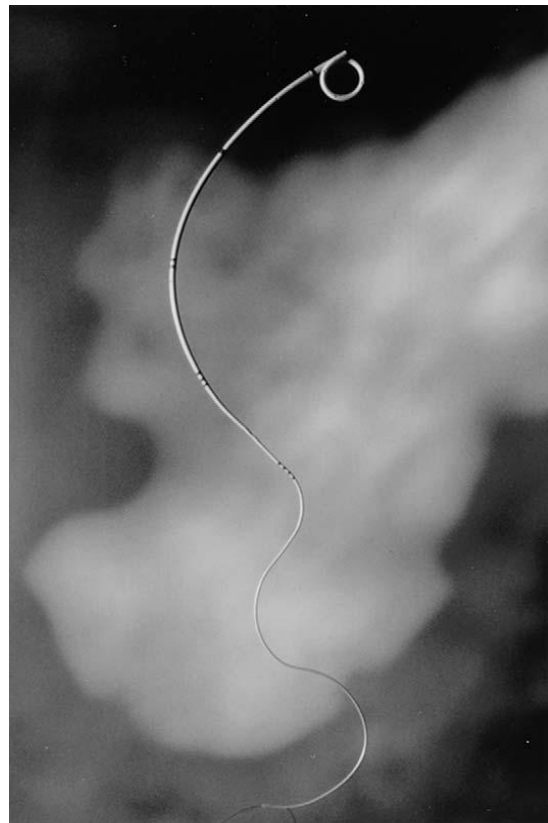
A:

- Tail stent
- Single J stent
- Tamsulosin

**Q: What is a tail stent?**

A: It does not have a bladder coil, instead has a long tail in bladder Tail stent - to reduce stent irritation.

- The proximal 7F stent tapers to a lumenless 3F distal tail.
- Its soft distal segment without a coil is thought to improve irritative voiding symptoms.
- It may also prevent stent-related flank pain, because reflux is less likely to occur with this stent in place.



**Q: what is dual durometer stent?**

A: firm Biomaterial, firm loop at kidney end  
Soft biomaterial, fine loop at Bladder end.

**Q: what is Biofilm?**

A:

- Surface coating formed due to proteins and other substances due to microbes.
- Makes microbe friendly environment
- Early colony, mid colony, late Biofilm colony
- $\text{Ca}^{++}$ ,  $\text{Mg}^{++}$  also get embedded in it forming encrustations.

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what is the best drug for Biofilm penetration?**

A: Oral fluoroquinolones.

**Q: what is Bio absorbable stent?**

A: Absorbs of Its own with time → 2-6 weeks

Made up of PLGA, Poly lactide Glycolic Acid

**Q: what stent is best for difficult /malignant stricture?**

A: metal mesh stents, metallic stents

**Q: What is the composition of metal stent?**

A: nickel/Titanium super alloy

**Q: what materials can be used for coating on stents?**

A:

- Hydrogel → decreases friction components
- Heparin → Prevents – Biofilm and encrustations both
- PTFE coated metal stents
- Antibiotic coated stents (Triclosan) → broad spectrum antibiotic
- Ketorolac coated stents
- Sirolimus coated stents
- Titanium coating → most Biological inert.

**Q: what are the peculiarities of i) C flex , ii) Silitek iii) Percuflex hybrid stents?**

A:

C-flex

- Low surface friction
- Hydrophilic coat
- High bio compatibility
- Moderate strength

Silitek

- High strength
- Poor ID/OD ratio → poor drainage

Percuflex

- Maximum ID/OD ratio – good drainage
- Most versatile stent

Polyurethra

- Strength –good
- Versatility- good
- poor biocompatibility
- Low cost
- Good coil strength

Silicone

- Highly biocompatible
- Poor strength
- Susceptible to external compression
- Poor coil retention.

**PCNL ...Initial-Puncture Needle**

**Q: what is the technical name of PCN needle?**

A: Initial Puncture needle

- Bwelled tip → chiba needle
- Diamond tip → Franseen type needle

**Q: What are the components of I.P needle?**

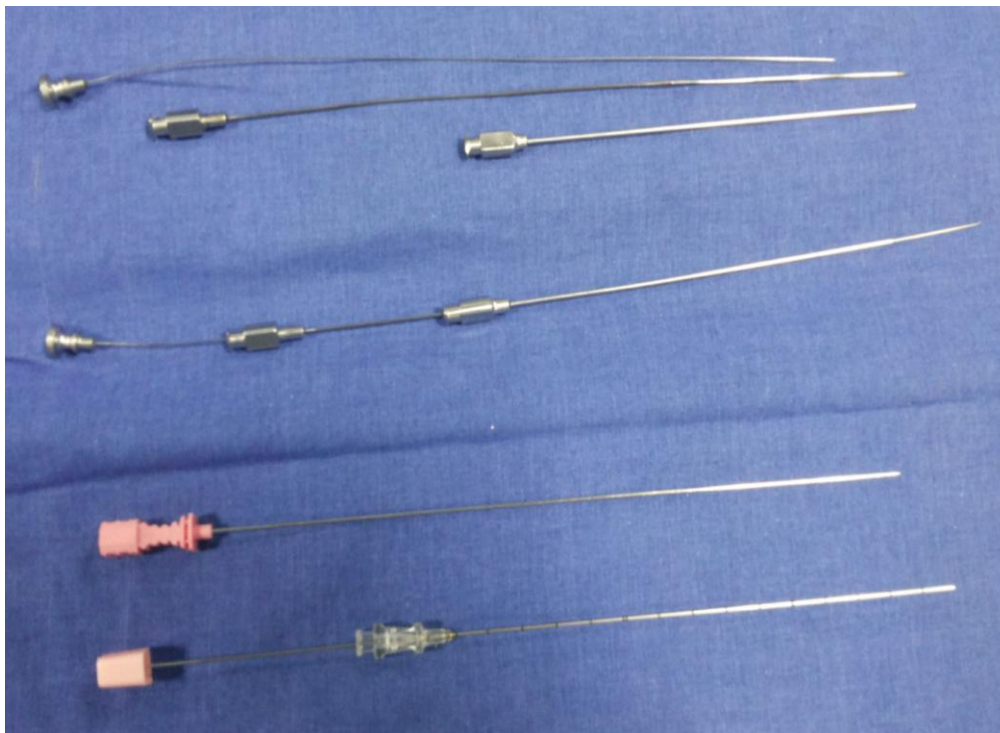
A:

Two piece needle – sheath

-Trocac – Beveled or diamond tip

Three piece needle → I.P needle (Von Sonenberg type)

- Central needle
- Introducer cannula (middle)
- Outer cannula sheath



**Q: what are the features of Chiba needle?**

A: fine Trocar

- Outer sheath → with centimeter markings
- Luer lock hub for fitting syringes
- Hub is radiolucent
- Shaft is radio opaque



## **Neeraj Sharma's ...Notes For Urology Practicals**

- Standard length -15 cm ...longer needle is 23 cm
- Echogenic tip for USG guided insertion.
- Tip protrudes 1 mm from the distal end of the trocar.
- Diamond tip – prevents deflection by sharply cutting through muscle and fascia while causing minimal shearing.
- A beveled tip tends to deviate in a direction away from the bevel. A diamond tipped needle runs a straight course.
- In general, the shorter the needle (11-15 cms) the easier it is to control.
- Longer needles are necessary for obese patients or when triangulation is utilized, because this later technique may require a longer tract or more flexibility to 'bend around' a rib.
- Standard I.P. needle takes a 0.035 G/w.
- The alternative access needle system uses a 21-gauge primary access needle that accepts a stiff-bodied .018-inch guidewire.
- The use of a dedicated conversion catheter over this .018-inch guidewire permits subsequent introduction of a .035- or .038-inch guidewire into the collecting system for further manipulations.



**Q: What is the degree of Beveled edge?**

A:  $16^{\circ}$

**Q: what are the standard sizes of I.P needle?**

A:

- 18 Gauge – 0.035 G/w
- 21 Gauge - 0.018 G/W

**Q: what disadvantages of Beveled tip?**

A:

- deviates from the tract
- More bleeding
- Diamond tip needle → straight course.



**Chiba tip – designed at Univ. of Chiba, Japan, Bevelled tip, 16 degrees, Echogenic**

**Q: when will you need longer needles?**

A: obese patient

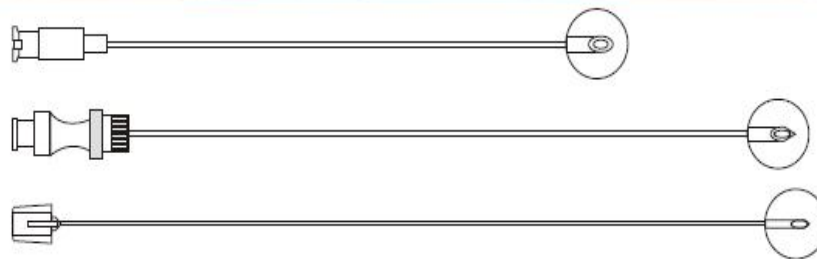
Triangulation Technique.

**Q: what is triangulation technique of PCNL?**

A: this can be understood if someone has seen or done the technique himself

Please watch -- <https://www.youtube.com/watch?v=ZsPsrtX5blg>

## I P NEEDLE WITH SHEATH



**Q: what are the advantages & disadvantages of using 21 Gauge needle?**

A: Adv: minimal Trauma

Multiple attempts can be made

Rarely perforation

Dis adv: → necessity of changing G/W

Takes only 0.018 G/W



Dilate tract over 0.018



Take out 0.018, deploy 0.0035



Again dilate



Central rod



Amplatz

## **LITHOCLAST**

### **Intra-corporeal lithotripters**

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#### ***BALLISTIC LITHOTRIPSY***

#### **PRINCIPLE**

- Relies on the energy generated by a moving projectile.
- The initial movement of the projectile can be induced by a variety of stimuli, but once the projectile is in contact with another object, the ballistic energy is transferred to the object.
- Flexible objects preserve the momentum of the energy, but inflexible objects such as stone, fragment on impact (JACKHAMMER EFFECT).
- Swiss Lithoclast – introduced in 1990, first ballistic lithotrite.
- The metal projectile in the hand piece is propelled by multiple bursts of compressed air against the head of a metal probe at a frequency of 12cycles per second. The probe tip is placed against the stone and the lithoclast is activated by a foot pedal.
- The electrokinetic lithotripter was introduced in mid -1990s.
- It consists of a rheostat and a handset containing an electric coil that generates an electromagnetic field which then vibrates the probe at 15-30 cycles per second.
- Whereas the Lithoclast is connected to the hospital central air supply or to a compressed air tank, the electrokinetic lithotripter requires electric power.
- Comparative studies showed no difference in stone fragmentation, proximal stone migration or safety margin.
- Hand piece of the electrokinetic lithotripter is heavier than that of the Lithoclast.

#### **2 recent improvements –**

- A suction device connecting to the Lithoclast probe allows simultaneous evacuation of stone particles.
- Flexible Nitinol probe allows use of the lithoclast through a flexible ureterscope.

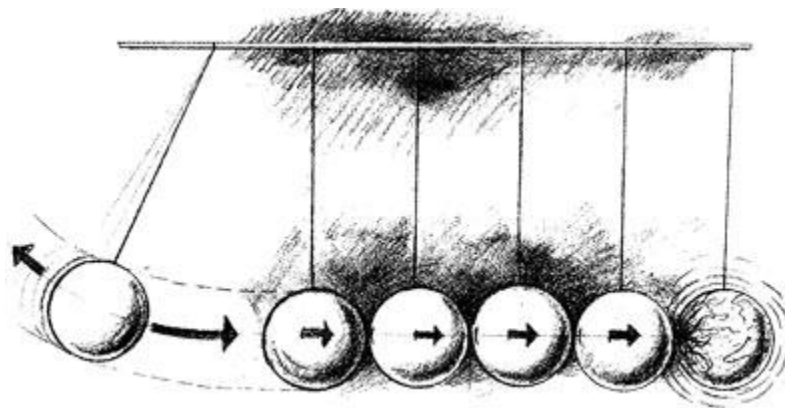
#### **Components**

- Compressed air supply : 5-6 bar
- Blast power: 3-4 bar
- Operating mode :- single/ multiple pulse
- Hand piece : 300-350gms
- Probe – 0.8mm, 1.0, 1.2, 1.5, 2.0, 2.5mm.
- Length – 425/620 mm
- 1mm, 1.6mm, 3.2mm



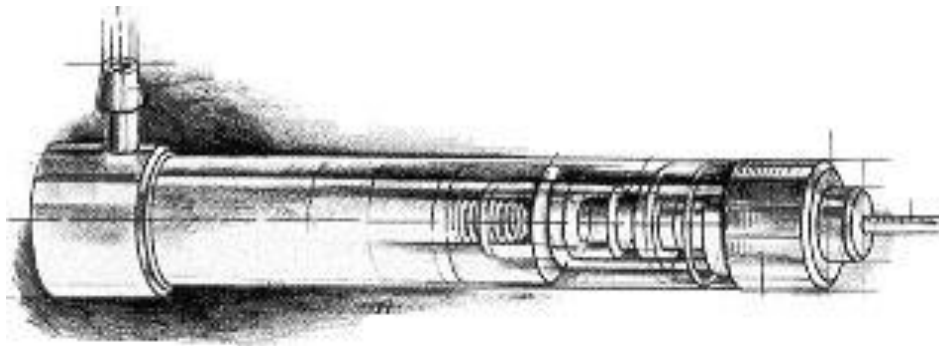
**Q: what is the working principle of lithoclast?**

A: The Swiss LithoClast<sup>®</sup> is a contact-type intracorporeal lithotripter which delivers pneumatically generated energy directed onto the stone. The following simplified drawing explains the working principle:



The projectile in the handpiece - which corresponds to the left ball in the drawing - is accelerated to high speed by means of precisely controlled bursts of compressed air. It is guided within precision tolerances of a few micrometers in the handpiece.

When it hits the probe installed in the handpiece in the same way as the first ball hits the series of subsequent balls, its kinetic impact energy is converted to a mechanical strain. The energy is transferred from one ball to the other or, as in the case of the hand-piece, propagates along the probe through to the calculus. In the same way the last ball of the series moves, the tip of the probe moves accordingly thus hitting the calculus. Transmission occurs as a result of the elastic deformation of the probe itself. By comparison, urinary stones are much more brittle in nature. When energy is transmitted from the LITHOCLAST probe to the calculus, the result is disintegration of the calculus. As a rule, successful disintegration occurs after only a few pressure wave impacts.



**Q: how does the lithoclast hammer come back to its neutral position to strike again?**

A: with the help of a rubber bushing

Rubber bushing recoil the hammer back

Initial probe handles were having the spring ,recent versions have rubber bushing

**Q: what are types of intracorporeal lithoclasts?**

A:

- Pneumatic
- Electrokinetic
- Ultrasonic
- Electro hydraulic

**Q: what is the principle of pneumatic lithoclast?**

A: Jack hammer effect

Metal projectile is propelled by multiple bursts of compressed air; which in turn propels the lithoclast probe.

**Q: How does probe comes back to its position?**

A: By Rubber bushing

**Q: what is the frequency of propeller?**

A: 12 cycle/sec

**Q: How is lithoclast activated?**

A: foot pedal.

**Q: What are the specifications of pneumatic lithoclast?**

A: compressed air supply 5-6 Bar

Blast Power - 3-4 Bar

Hand piece - 350 gm

Probe – 0.8mm, 1.0 mm, 1.5mm, and 2.0 mm

## **Neeraj Sharma's ...Notes For Urology Practicals**

Length - 42 to 62 cm.

**Q: what is electrokinetic lithotripter?**

A:

- Consists of a rheostat & a handset contains electric coil that generates electro magnetic field that vibrates the probe.
- Hand piece of Electrokinetic lithotripter is heavier than pneumatic.

**Q: what is the length of ureterscope & Lithoclast probe?**

A: 43 cm – Ureterscope

- 62 cm – Lithoclast probe for URS
- 42 cm – Lithoclast probe for nephroscope

**Q: what are the advantages & disadvantages of pneumatic lithoclast?**

A: Adv:

- Breaks even hard stones
- Low risk of perforation
- Low cost
- Low maintenance
- No heat generation

Dis adv:

- Large fragments
- Fly back effects
- Loss of vision (if sharing same channel)
- Bending of probe → loss of effective hitting.

**Q: who invented ultrasonic lithotripsy?**

A: Mulvaney.

**Q: What are the components of ultrasonic lithoclast system?**

A: Electric Rheostat → produces current & excites piezo crystals

Piezoceramic plate → produces ultrasonic wave @ 25000 Hz

Hollow steel probe → transfer the USG energy from piezocrystals to stone.

**Q: How does the stone break?**

A: The probe causes the stone to resonate @ high frequency & Break

**Q: What is the speed of irrigation?**

A: 30 ml/ min

**Q: what is the Sn pressure required for Ultrasound lithotripsy**

A: 60-80 cm H<sub>2</sub>O

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the probe sizes?**

A: 2.5 to Fch (0.8mm-4mm)

**Q: What are the adv & dis adv of USG lithoclast?**

A: Adv:

- Simultaneous stone fragment removal simultaneous outflow, mean it works like Continuous sheath
- Fragments upto 2mm can just be aspirated.
- More efficient PCNL

Dis adv

- Heating at probe tip → damage to ureter suction channel Blockage.



---

**LASER**

**Q: what is the most efficient way to break stones?**

A: LASER light amplification stimulated emission of Radiation.

**Q: what are the characteristics of Holmium laser?**

A: state: solid state laser

Type: Pulse type, pulse duration 250-300  $\mu$  sec

Depth of penetration: 1 mm

Water absorption: very high

**Q: what is the mechanism of stone fragmentation?**

A: Photo thermal mechanism that caused stone vaporization.

**Q: what are the machine settings for Holmium URS?**

A:

	Pulse energy	Frequency	Fibre
Start with	0.8 J	8 Hz	365 $\mu$ m
Increase to	1.0 J	10 Hz	365 $\mu$ m
For highly resistant Stone	1.5 J	15 Hz	365 $\mu$ m

**Q: How will you break the stone with laser?**

A: Pin it down against ureteric wall and touch the laser to the stone & BANG.

One has to paint the stone with laser.

**Q: what are the advantages / dis adv of the laser?**

A:

Adv:

- Flexible wire
- Safer than EHL
- Can be used with flexi-URS
- Smaller fragments
- Independent of stone chemistry & composition
- Even when bleeding parameters are Dearranged
- No fly back of stone

Dis adv:

- Cost, availability
- Corneal damage
- Sand storm effect

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the recent advances in lasers?**

A: Er: YAG – Erbium YAG fragments calculi through Photo thermal mechanism

- Wavelength of 2940 nm
- absorbs water efficiently than Holmium.

**Q: what is FREDDY?**

A:

- Frequency Doubled Double pulse YAG
- Basically ND; YAG laser with doubled /two working frequencies 532 & 1064.
- Efficiently breaks stones.

### **Filliform & Followers**

**Q: What are filiforms?**

A: These are straight, malleable, flexible wires that are used to negotiate the stricture.

They are female components with a socket at rear-end for attachment of the followers



**Q: what is the full name of filiform?**

A: Heyman filiform

Heyman followers

**Q: what are the types of tips available for filiform?**

A: spiral tip  
Olive tip } sizes 4 Fch, 6 Fch

**Q: what are the sizes of followers?**

A: length 18"

Size: 8-24 Fch

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: How will you confirm that a follower has reached the bladder?**

A: Urine comes out of followers

Follower has a side hole at its tip.

Once follower is pushed behind the filiform the filiform being soft coiled in the bladder.

**Q: what is multiple filliform Hit & try method, for urethral stricture, known as?**

A: Fagots method

In fagots method the urethra is filled with as many as filliform bougies hoping that atleast one of them will go across the stricture .the filliform which crosses is retained and rest other removed .urethra is then dilated using filliform followers.

***Neeraj Sharma's-***  
**NOTES FOR UROLOGY PRACTICALS**

**Instrument Sterilization**

## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the methods of sterilization you know?**

A:

Thermal (physical) – Moist heat under pressure (autoclave), - dry heat

Chemical

- E.T.O
- formaldehyde
- Glutraddehyde
- Hypochlorous acid
- $H_2O_2$ —sterrad sterilization

Radiation

- Micro wave (non- ionizing)
- X-ray (ionizing)

**Q: what is the difference b/w disinfection & sterilization?**

A: Disinfection → removal of pathogenic infective organism

Sterilization: Removal of all organism – Harmful, Benign, Commensals and removal of spores also.

**Q: What is Cidex?**

A: Buffered Glutraddehyde soln. 2%, 2.5%, 3.0%, 3.5%

Type: activated Buffered alkaline Glutraddehyde

MOA: Denaturation of Proteins

**Cidex:** Active ingredient: 2% Glutraddehyde. The manufacturer's instructions indicate that a minimum of 10 hours is required for sterilization.

**Cidex** is a common designation for a variety of solutions used for antimicrobial or disinfection purposes:

- *Cidex OPA*, a trade name for a solution with phthalaldehyde as active ingredient
- *Nu-Cidex*, with peracetic acid
- *Cidex Plus*, with glutraddehyde

## Neeraj Sharma's ...Notes For Urology Practicals



•  
**Q: How is Cidex activated?**

A: By adding a activation powered buffer to the liquid.

**Q: what is the time required for sterilization**

A: Sterilization: - 10 hrs

High level disinfectant; - 25-30 min

Completely immersed with no air bubbles

**Q: what are the steps of Cidex disinfn?**

A:

1<sup>st</sup> step – cleaning

2<sup>nd</sup> step: immersion (20 min minimum)

3<sup>rd</sup> – cleansing (with water /NS)

4<sup>th</sup> – Drying

**Q: How will you keep a check on cidex soln?**

A: chemical dip sticks indicators

- Less than 1.55 conc<sup>n</sup> means discard it.

**Q: what is the time duration of Cidex expiry?**

A: Max 28 days after activation (manufacture dependent)

Cidex comes in two formulations, Cidex and Cidex-7 (long-life). The shelf life of activated Cidex is 15 days and of activated Cidex-7 is 28 days.

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q: what is CIDEX OPA?**

A: Since its introduction in 1999, thousands of healthcare facilities around the world have been using CIDEX® OPA Solution every day to safely high-level disinfect flexible endoscopes and other medical devices.

- *Cidex OPA*, a trade name for a solution with phthalaldehyde as active ingredient
- **Effective** – achieves high-level disinfection in 5 minutes at 20°C.
- **Fast-acting** – fast turnaround of reprocessed instruments.
- **Long-lasting efficacy** – reusable for up to 14 days when monitored with CIDEX® OPA Test Strips.
- **Easy-to-use** – solution with low odor – **requires no activation or mixing.**
- **Safe to use for healthcare professionals** – low vapor pressure for minimal inhalation exposure risk, ready-to-use solution reduces handling.
- CIDEX® OPA Solution provides a broad-spectrum activity against bacteria, mycobacteria, viruses and fungi.
- CIDEX® OPA Solution offers excellent materials compatibility and can therefore be used to disinfect a wide range of medical instruments made of aluminum, brass, copper, stainless steel, plastics, elastomers and dental materials.

### **Q: what is E.T.O [Et.O]?**

A: Ethylene Oxide Sterilization.

M.O.A of E.T.O → Chemical alkylation agent that kills micro organisms including spores by interfering with protein processes leading to death

### **Q: what are the parameters of ETO?**

A: Temp = 60° c – for plastics, 120° c for glass & metals

Moisture = 50% moisture

ETO conc → > 90% E.O

Timing → minimum 2 hrs in pressure chamber.

### **Q: describe ETO sterilization?**

A: Ethylene Oxide (EtO) is a common gas used for low temperature sterilization. It is a colorless, poisonous gas that attacks the cellular proteins and nucleic acids of microorganisms. It is most commonly used to sterilize instruments with long lumens such as endoscopes and all materials that have to be sterilized but cannot withstand higher temperature. EtO process temperatures from 25 - 55°C are used. A lower temperature results in a less efficient process which leads to a longer exposure time.

### **EtO Sterilization Cycle**

There are at least three stages in a typical EtO sterilization cycle:

- Preconditioning
- Sterilization
- Aeration (Degassing)

Cycle time is usually more than 14 hours.

### **Preconditioning**

Preconditioning prepares the chamber environment to meet the ideal conditions for temperature, pressure and humidity. First air is removed from the chamber to allow for gas penetration. A leakage test is performed, to ensure that staff and environment are safe. Next, some steam is injected into the chamber and humidifies the load, since EtO is only effective in a humid environment. The chamber is heated by either steam or hot water which is present in the jacket. Normally the jacket is kept at the same temperature 24/7 to minimize temperature fluctuations.

### **Sterilization**

The second stage is the actual sterilization process. The EtO enters the chamber via evaporation with a certain amount of steam to keep the humidity level up as well as to make sure the EtO is reaching all parts of the load. When the required concentration in the chamber and load is achieved the actual sterilization stage starts. The lower the gas concentration in the chamber the longer is the sterilization time. As EtO is absorbed by many kinds of plastic materials it is important to keep the concentration at the right level. To achieve this EtO is sometimes added to the chamber after a while. It is of major importance to ensure the appropriate concentration level of EtO in the chamber to achieve effective and safe sterilization.

### **Aeration (Degassing)**

Aeration is the most important and longest part of the EtO sterilization cycle. As mentioned, materials such as plastics and rubbers absorb gas and if applied to patients, the toxic gas could damage their body tissue! For this reason it is very important to have an excessive aeration stage to remove any remaining EtO gas and to allow absorbed gas to evaporate again from the sterilized items. This is done by circulating HEPA filtered air over the load at a temperature of 30°C to 50°C. This is sometimes done in the sterilizer's chamber, but sometimes the sterilized items are placed in a special aeration cabinet.

### **Q: compare adv. & disadv of ETO?**

#### **A: Advantages of EtO are:**

- Low temperature
- High efficiency – destroys microorganisms including resistant spores
- Large sterilizing volume/ chamber capacity
- Non corrosive to: plastic, metal and rubber materials

#### **Disadvantages are:**

- Excessively Long cycle
- Safety concerns - carcinogenic to humans
- Toxicity issues - toxic residues on surgical instruments and tubing
- Not recommended for flexible scope
- EtO is flammable
- Requires special room conditions, safety equipment and separate ventilation system
- Relatively high annual costs for maintenance, servicing and consumables

### **Q: How are telescopes sterilized?**

A: Best autoclave

Practically by cidex



## **Neeraj Sharma's ...Notes For Urology Practicals**

### **Q; what is sterrad?**

A: The Sterrad Sterilization System by Advanced Sterilization Products (ASP) exploits the synergism between peroxide and low temperature gas plasma (an excited or ionized gas) to rapidly destroy microorganisms (Figure 1). At the completion of the sterilization process based on this technology, no toxic residues remain on the sterilized items. The technology is particularly suited to the sterilization of heat and moisture sensitive instruments since process temperatures do not exceed about 50 degrees C (140 degrees F) and sterilization occurs in a low moisture environment. Total process time is about one hour. The efficacy of the process has been demonstrated against a broad spectrum of microorganisms and on a large number of substrates used in medical instruments.

Please watch ... [https://www.youtube.com/watch?v=inCeSWtw\\_-Q](https://www.youtube.com/watch?v=inCeSWtw_-Q)

**Neeraj Sharma's-**  
**NOTES FOR UROLOGY PRACTICALS**

**Statistics**

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## **Percentages**

“Per cent” means per hundred, so a percentage describes a proportion of 100. For example 40% is 40 out of 100

To calculate a percentage, divide the number of items or patients in the category by the total number in the group and multiply by 100.

Example: if only 10 of the 200 apples were bad, what percent is that?

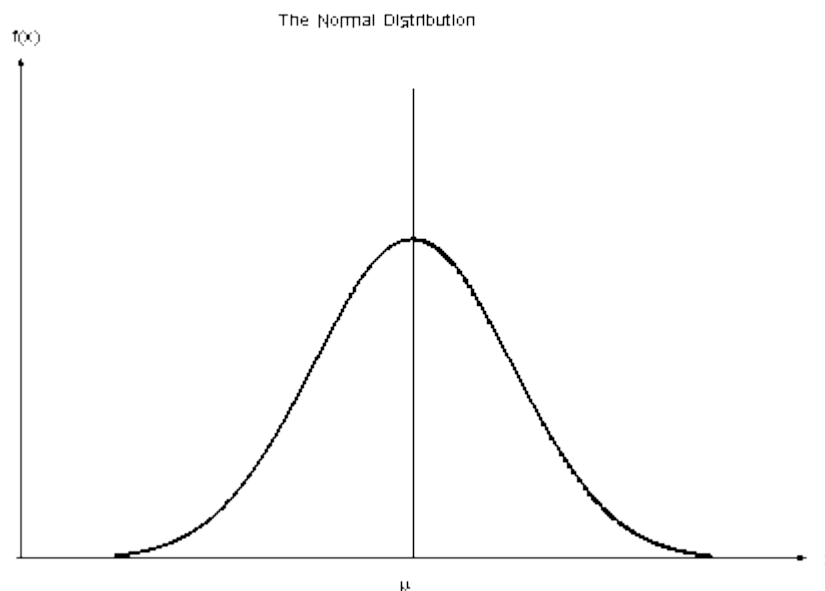
As a percentage it is:  $(10/200) \times 100 = 5\%$

**5%** of those apples were bad

---

## **Normal Distribution curve**

The “normal distribution” is referred to a lot in statistics. It is the symmetrical, bell-shaped distribution of data



---

## **Mean**

The mean is the sum of all the values, divided by the number of values.

For example

Five women in a study on lipid-lowering agents are aged 52, 55, 56, 58 and 59 years.

Add these ages together:  $52 + 55 + 56 + 58 + 59 = 280$

## **Neeraj Sharma's ...Notes For Urology Practicals**

Now divide by the number of women: = 56

So the mean age is 56 years.

Five women in a study on anti hypertensive agents are aged 52, 55, 57, 58 and 59 years.

Add these ages together:

$$52 + 55 + 57 + 58 + 59 = 281$$

Now divide by the number of women: = 56.2

So the mean age is 56.2 years.

Note that the mean value may (like 56) or may not be (like 56.2) the exact variable available in data

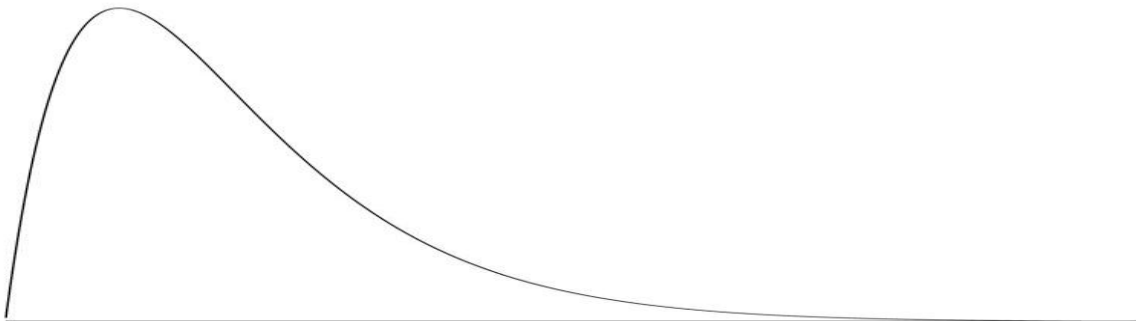
### **Watch out for...**

If a value (or a number of values) is a lot smaller or larger than the others, “skewing” the data, the mean will then not give a good picture of the typical value. For example, if there is a sixth patient aged 92 in the study then the mean age would be 62, even though only one woman is over 60 years old. In this case, the “median” may be a more suitable mid-point to use.

---

## **Median**

It is the point which has half the values above, and half below. It is used to represent the average when the data are not symmetrical, for instance the “skewed” distribution



### **EXAMPLE**

Using the first example of five patients aged 52, 55, 56, 58 and 59, the median age is 56, the same as the mean – half the women are older, half are younger. However, in the second example with six patients aged 52, 55, 56, 58, 59 and 92 years, there are two “middle” ages, 56 and 58. The median is halfway between these, i.e. 57 years. This gives a better idea of the mid-point of this skewed data than the mean of 62.

It is used when we need a label for the most frequently occurring event.

The mode is the most common of a set of events.

The "mean" is the "average" you're used to, where you add up all the numbers and then divide by the number of numbers.

The "median" is the "middle" value in the list of numbers. To find the median, your numbers have to be listed in numerical order, so you may have to rewrite your list first.

The "mode" is the value that occurs most often. If no number is repeated, then there is no mode for the list.

- **Find the mean, median, mode, and range for the following list of values:**

**13, 18, 13, 14, 13, 16, 14, 21, 13**

The mean is the usual average, so:

$$(13 + 18 + 13 + 14 + 13 + 16 + 14 + 21 + 13) \div 9 = 15$$

Note that the mean isn't a value from the original list. This is a common result. You should not assume that your mean will be one of your original numbers.

The median is the middle value, so I'll have to rewrite the list in order:

13, 13, 13, 13, 14, 14, 16, 18, 21

There are nine numbers in the list, so the middle one will be the  $(9 + 1) \div 2 = 10 \div 2 = 5$ th number:

13, 13, 13, 13, 14, 14, 16, 18, 21

So the median is 14.

The mode is the number that is repeated more often than any other, so 13 is the mode

---

### ***Standard Deviation***

When is it used? Standard deviation (SD) is used for data which are "normally distributed" to provide information on how much the data vary around their mean.

What does it mean? SD indicates how much a set of values is spread around the average.

A range of one SD above and below the mean (abbreviated to 1 SD) includes 68.2% of the values.

2 SD includes 95.4% of the data. 3 SD includes 99.7%.

it is not necessary to know how to calculate the SD. It is worth learning the figures above off by heart, so a reminder –

☐ 1 SD includes 68.2% of the data

☐ 2 SD includes 95.4%,

☐ 3 SD includes 99.7%.

---

## **CONFIDENCE INTERVALS**

Confidence intervals are constructed at a *confidence level*, such as 95 %, selected by the user. What does this mean? It means that if the same population is sampled on numerous occasions and interval estimates are made on each occasion, the resulting intervals would bracket the true population parameter in approximately 95 % of the cases.

### **EXAMPLES**

The average systolic BP before treatment in study A, of a group of 100 hypertensive patients, was 170 mmHg. After treatment with the new drug the mean BP dropped by 20 mmHg. If the 95% CI is 15–25, this means we can be 95% confident that the true effect of treatment is to lower the BP by 15–25 mmHg.

The CI gives the range in which the true value (i.e. the mean change in BP if we treated an infinite number of patients) is likely to be.

### ***Standard deviation and confidence intervals – what is the difference?***

Standard deviation tells us about the variability (spread) in a sample.

The CI tells us the range in which the true value (the mean if the sample were infinitely large) is likely to be.

---

## ***P -VALUES***

The *P* (probability) value is used when we wish to see how likely it is that a hypothesis is true. The Hypothesis is usually that there is *no* difference between two treatments, known as the “null hypothesis”.

The *P* value gives the probability of any observed difference having happened by chance.

$P = 0.5$  means that the probability of the difference having happened by chance is 0.5 in 1, or 50:50.

$P = 0.05$  means that the probability of the difference having happened by chance is 0.05 in 1, i.e. 1 in 20.

It is the figure frequently quoted as being “statistically significant”, i.e. unlikely to have happened by chance and therefore important. *P* value of 0.05 and so appear significant!

The lower the *P* value, the less likely it is that the difference happened by chance and so the higher the significance of the finding.  $P = 0.01$  is often considered to be “highly significant”. It means that the difference will only have happened by chance 1 in 100 times. This is unlikely, but still possible.

$P = 0.001$  means the difference will have happened by chance 1 in 1000 times, even less likely, but still just possible. It is usually considered to be “very highly significant”.

**EXAMPLE**

Out of 50 new babies on average 25 will be girls, sometimes more, sometimes less.

Say there is a new fertility treatment and we want to know whether it affects the chance of having a boy or a girl. Therefore we set up a null hypothesis – that the treatment *does not* alter the chance of having a girl.

Out of the first 50 babies resulting from the treatment, 15 are girls. We then need to know the probability that this just happened by chance, i.e. did this happen by chance or has the treatment had an effect on the sex of the babies?

The  $P$  value gives the probability that the null hypothesis is true.

The  $P$  value in this example is 0.007. Do not worry about how it was calculated, concentrate on what it means. It means the result would only have happened by chance in 0.007 in 1 (or 7 in 1000) times if the treatment did not actually affect the sex of the baby. This is highly unlikely, so we can reject our hypothesis and conclude that the treatment probably *does* alter the chance of having a girl.

The “null hypothesis” is a concept that underlies this test.

The test method assumes (hypothesizes) that there is *no* (null) difference between the groups. The result of the test either supports or rejects that hypothesis. The null hypothesis is generally the opposite of what we are actually interested in finding out. If we are interested if there is a difference between two treatments then the null hypothesis would be that there is no difference and we would try to disprove this.

Remember that  $P = 0.05$  is usually classed as “significant”,

$P = 0.01$  as “highly significant” and  $P = 0.001$  as “very highly significant”

---

**Student's  $t$ -test**

The  $t$ -statistic was introduced in 1908 by William Sealy Gosset, a chemist working for the Guinness brewery in Dublin, Ireland (“Student” was his pen name). Company policy at Guinness forbade its chemists from publishing their findings, so Gosset published his statistical work under the pseudonym “Student”

$t$  tests are typically used to compare just two samples. They test the probability that the samples come from a population with the same mean value.

Parametric statistics are used to compare samples of “normally distributed” data . If the data do *not* follow a normal distribution, these tests should not be used.

## Neeraj Sharma's ...Notes For Urology Practicals

This t test calculates the p value . there is no need to know how a T test is performed . remember that T test can be performed when there is need to compare two data which are normally distributed

### EXAMPLE

Two hundred adults seeing an asthma nurse specialist were randomly assigned to either a new type of bronchodilator or placebo. After 3 months the peak flow rates in the treatment group had increased by a mean of 96 l/min (SD 58), and in the placebo group by 70 l/min (SD 52). The null hypothesis is that there is no difference between the bronchodilator and the placebo.

The  $t$  statistic is 11.14, resulting in a  $P$  value of 0.001. It is therefore very unlikely (1 in 1000 chance) that the null hypothesis is correct so we reject the hypothesis and conclude that the new bronchodilator is significantly better than the placebo.

---

## CHI-SQUARED TEST

Usually written as  $\chi^2$  (for the test) or  $X^2$  (for its value); Chi is pronounced as in sky without the s. Do not try to understand the  $X^2$  value, just look at whether or not the result is significant. do not worry about the actual value of  $X^2$  but look at its  $P$  value. requires the data to follow a specific distribution, usually a normal distribution.

Chi-square is a statistical test commonly used to compare observed data with data we would expect to obtain according to a specific hypothesis. For example, if, according to Mendel's laws, you expected 10 of 20 offspring from a cross to be male and the actual observed number was 8 males, then you might want to know about the "goodness to fit" between the observed and expected. Were the deviations (differences between observed and expected) the result of chance, or were they due to other factors. How much deviation can occur before you, the investigator, must conclude that something other than chance is at work, causing the observed to differ from the expected. The chi-square test is always testing what scientists call the **null hypothesis**, which states that there is no significant difference between the expected and observed result.

The formula for calculating chi-square ( $\chi^2$ ) is:  $X^2 = \sum (o-e)^2/e$

**Chi-square requires that you use numerical values, not percentages or ratios.**

**Chi-square should not be calculated if the expected value in any category is less than 5.**

State your conclusion in terms of your hypothesis.

- If the  $p$  value for the calculated  $\chi^2$  is  $p > 0.05$ , accept your hypothesis. 'The deviation is small enough that chance alone accounts for it. A  $p$  value of 0.6, for example, means that there is a 60% probability that any deviation from expected is due to chance only. This is within the range of acceptable deviation.



## **Neeraj Sharma's ...Notes For Urology Practicals**

- b. If the p value for the calculated  $\chi^2$  is  $p < 0.05$ , reject your hypothesis, and conclude that some factor other than chance is operating for the deviation to be so great. For example, a p value of 0.01 means that there is only a 1% chance that this deviation is due to chance alone. Therefore, other factors must be involved.

### **EXAMPLES**

A group of patients with bronchopneumonia were treated with either amoxicillin or erythromycin.

Comparison of effect of treatment of bronchopneumonia with amoxicillin or erythromycin

Type of antibiotic given	Amoxicillin	Erythromycin	Total
Improvement at 5 days	144 (60%)	160 (67%)	304 (63%)
No improvement at 5 days	96 (40%)	80 (33%)	176 (37%)
Total	240 (100%)	240 (100%)	480 (100%)

$$\chi^2 = 2.3; P = 0.13$$

Remember, do not worry about the  $\chi^2$  value itself, but see whether it is significant. In this case  $P$  is 0.13, so the difference in treatments is not statistically significant.

---

## **RISK RATIO**

*Risk* is the probability that an event will happen. It is calculated by dividing the number of events by the number of people at risk. For example if 6 persons develop ca bladder out of 100 smokers the risk of developing ca bladder in smokers is 6%

*risk ratios*. These are calculated by dividing the risk in the treated or exposed group by the risk in the control or unexposed group. Now if 2 persons out of the 100 non-smokers develop the ca bladder than relative risk ratio of smoking leading to ca bladder is 3 times (6% divided by 2% = 3)

---

### **RISK REDUCTION AND NUMBERS NEEDED TO TREAT**

"Absolute risk reduction" (ARR) - ARR is the difference between the event rate in the intervention group and that in the control group. Rate of pulmonary metastasis occurring in patients taking sunitinib is 12% and those not taking sunitinib is 20% then absolute risk reduction due to sunitinib is 8% but relative risk reduction is 60% (12% divided by 20%, multiply by 100,=60%)

NNT is the number of patients who need to be treated for one to get benefit.

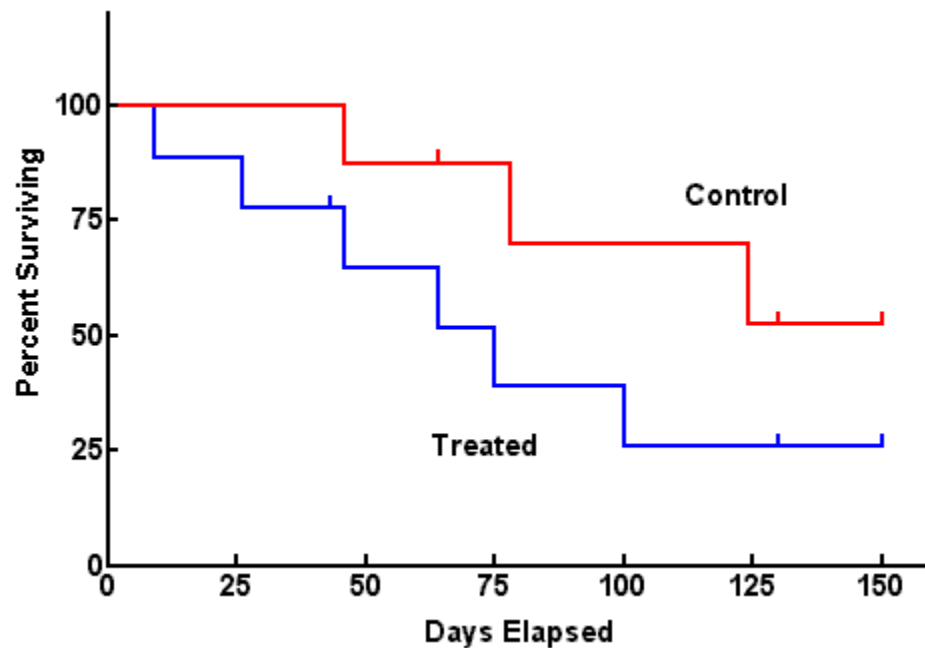
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**SURVIVAL ANALYSIS: LIFE TABLES AND KAPLAN–MEIER PLOTS**

Survival analysis techniques are concerned with representing the time until a single event occurs. That event is often death, but it could be any other single event, for example time until discharge from hospital.

Survival analysis techniques are able to deal with situations in which the end event has not happened in every patient or when information on a case is only known for a limited duration – known as “censored” observations

The Kaplan–Meier approach recalculates the survival rate when an end event (e.g. death) occurs in the data set, i.e. when a change happens rather than at fixed intervals. This is usually represented as a “survival plot”.



**SENSITIVITY, SPECIFICITY AND PREDICTIVE VALUE**

	Sick	Not Sick	
Test Positive	a	b	a + b
Test Negative	c	d	c + d
	a + c	b + d	Total

		Patients with <u>bowel cancer</u> (as confirmed on <u>endoscopy</u> )		
		Condition Positive	Condition Negative	
Fecal Occult Blood Screen Test Outcome	Test Outcome Positive	<b>True Positive</b> (TP) = 20	<b>False Positive</b> (FP) = 180	<b>Positive predictive value</b> = TP / (TP + FP) = 20 / (20 + 180) = <b>10%</b>
	Test Outcome Negative	<b>False Negative</b> (FN) = 10	<b>True Negative</b> (TN) = 1820	<u>Negative predictive value</u> = TN / (FN + TN) = 1820 / (10 + 1820) ≈ <b>99.5%</b>
		<u>Sensitivity</u> = TP / (TP + FN) = 20 / (20 + 10) ≈ <b>67%</b>	<u>Specificity</u> = TN / (FP + TN) = 1820 / (180 + 1820) = <b>91%</b>	

**Sensitivity.** If a patient has the disease, we need to know how often the test will be positive, i.e.

“positive in disease”. This is calculated from:  $A / (A + C)$

This is the rate of pick-up of the disease in a test, and is called the *Sensitivity*.

**Specificity.** If the patient is in fact healthy, we want to know how often the test will be negative, i.e.

“negative in health”.

This is given by:  $D / (D + B)$

This is the rate at which a test can exclude the possibility of the disease, and is known as the *Specificity*.

**Positive Predictive Value.** If the test result is positive, what is the likelihood that the patient will have the condition?

Look at:  $A / (A + B)$

This is known as the *Positive Predictive Value* (PPV).

---

#### **IMPACT FACTOR of a journal**

The **impact factor (IF)** of an academic journal is a measure reflecting the average number of citations to recent articles published in that journal. It is frequently used as a proxy for the relative importance of a journal within its field, with journals with higher impact factors deemed to be more important than those with lower ones.

##### **Calculation**

In any given year, the impact factor of a journal is the average number of citations received per paper published in that journal during the two preceding years. For example, if a journal has an impact factor of 3 in 2008, then its papers published in 2006 and 2007 received 3 citations each on average in 2008.

The 2008 impact factor of a journal would be calculated as follows:

2008 impact factor =  $A/B$ .

Where:

$A$  = the number of times that all items published in that journal in 2006 and 2007 were cited by indexed publications during 2008.

$B$  = the total number of "citable items" published by that journal in 2006 and 2007. ("Citable items" for this calculation are usually articles, reviews, proceedings, or notes; not editorials or letters to the editor).

## **Neeraj Sharma's ...Notes For Urology Practicals**

### **IMPACT factor, Subject Category: Urology. Year: 2013.**

Rank	Title	Impact factor	Country
1	European Urology	12.59	Netherlands
2	Journal of Urology	3.86	United States
3	American Journal of Physiology - Renal Physiology	3.76	United States
4	BJU International	3.48	United Kingdom
5	Neurourology and Urodynamics	2.4	United States
6	Prostate	3.67	United States
7	Prostate Cancer and Prostatic Diseases	2.98	United Kingdom
8	Journal of Endourology	2.29	United States
9	World Journal of Urology	3.18	Germany
10	Journal of Sexual Medicine	3.38	United Kingdom
11	International Urogynecology Journal and Pelvic Floor Dysfunction	2.25	United Kingdom
12	Urology	2.28	United States
13	International Journal of Andrology	3.35	United Kingdom
14	Nature Reviews Urology	2.47	United Kingdom
15	International Journal of Urology	2.18	United Kingdom
16	Current Opinion in Urology	2.35	United States
17	CardioRenal Medicine	2.14	Switzerland
18	Urologic Oncology	1.79	United States
19	Abdominal Imaging	2	United States
20	Current Urology Reports	2.18	United States
21	Urologic Clinics of North America	1.74	United Kingdom
22	Systems Biology in Reproductive Medicine	1.84	United Kingdom
23	Asian Journal of Andrology	2.22	United Kingdom
24	International Neurourology Journal	1.34	South Korea
25	Therapeutic Advances in Urology	2.02	United States
26	Journal of Pediatric Urology	1.51	Netherlands
27	Clinical Genitourinary Cancer	1.89	Netherlands
28	Urological Research	1.58	Germany

## **Neeraj Sharma's ...Notes For Urology Practicals**

29	BMC Urology	2.21	United Kingdom
30	Journal of Andrology	1.83	United States
31	International Journal of Impotence Research	1.55	United Kingdom
32	Urologia Internationalis	1.38	Switzerland
33	Canadian journal of urology, The	1.1	Canada
34	Advances in Urology	1.72	United States
35	Korean Journal of Urology	1.24	South Korea
36	Scandinavian Journal of Urology	1.36	United Kingdom
37	International Urology and Nephrology	1.43	Netherlands
38	European Urology, Supplements	0.95	Netherlands
39	International braz j urol : official journal of the Brazilian Society of Urology	1.11	Brazil
40	Andrologia	1.27	United Kingdom
41	Urology Journal	0.84	Iran
42	Female Pelvic Medicine and Reconstructive Surgery	1.05	United States
43	LUTS: Lower Urinary Tract Symptoms	0.59	Japan
44	Journal of the Canadian Urological Association	0.83	Canada
45	Actas Urologicas Espanolas	1.26	United Kingdom
46	Minerva Urologica e Nefrologica	0.85	Italy
47	Seksuologia Polska	0.86	Poland
<b>48</b>	<b><i>Urology Annals</i></b>	<b>1.11</b>	<b><i>India</i></b>
<b>49</b>	<b><i>Indian Journal of Urology</i></b>	<b>0.55</b>	<b><i>India</i></b>
50	Journal of Men's Health	0.76	Netherlands

**Q: who is the editor of IJU?**

A: **Editor** Rajeev Kumar, New Delhi

**Editorial Committee Chairman:** Ganesh Gopalakrishnan, Coimbatore

**Q: who was the immediate past editor?**

A: Dr Nitin Kekre

**Q: who was the founder editor of IJU?**

A: Dr.Mahendra Bhandari founded the prestigious Indian Journal of Urology and was the first editor from 1984-1994.

## Neeraj Sharma's ...Notes For Urology Practicals

**Q: what is an indexed journal?**

A:

- There is a **United States National Library of Medicine (NLM)** which took upon itself to catalog all the biomedical journals available.
- **NLM** used to publish a Journal Catalogue by the name of **Index Medicus** which contains a list of all the Journals indexed by the library. The Index has stopped Hardcopy publication since December 1997 due to very few subscriptions.
- NLM also runs **National Center for Biotechnology Information (NCBI)**. NCBI contains Databases of Articles of Journals which are meant for facilitating research by an easy retrieval system. This Database is named **MEDLINE (Medical Literature Analysis and Retrieval System Online)**.
- **MEDLINE** can be accessed through easy-to-use Online Interface known as **PubMed**.
- As of November 2012, 5,640 journals are currently indexed for MEDLINE.
- An indexed journal is one, which is part of this MEDLINE index

**Q: what is evidence based medicine?**

A: **Evidence-based medicine (EBM)** is a form of medicine that aims to optimize decision-making by emphasizing the use of evidence from well designed and conducted research. Although all medicine based on science has some degree of empirical support, EBM goes further, classifying evidence by its epistemologic strength and requiring that only the strongest types (coming from meta-analyses, systematic reviews, and randomized controlled trials) can yield strong recommendations; weaker types (such as from case-control studies) can yield only weak recommendations. The term was originally used to describe an approach to teaching the practice of medicine and improving decisions by individual physicians.<sup>[1]</sup> Use of the term rapidly expanded to include a previously described approach that emphasized the use of evidence in the design of guidelines and policies that apply to populations

**Q: what are the levels of evidences?**

A: Levels of evidence and grade of guideline recommendations

Level	Type of evidence
1a	Evidence obtained from meta-analysis of randomized trials.
1b	Evidence obtained from at least one randomized trial.
2a	Evidence obtained from one well-designed controlled study without randomization.
2b	Evidence obtained from at least one other type of well-designed quasi-experimental study.
3	Evidence obtained from well-designed non-experimental studies, such as comparative studies, correlation studies and case reports.
4	Evidence obtained from expert committee reports or opinions or clinical experience of respected authorities.

**Q: what are the grades of recommendation?**

A: Grade of recommendation

Grade	Nature of recommendations
A	Based on clinical studies of good quality and consistency addressing the specific recommendations and including at least one randomized trial.
B	Based on well-conducted clinical studies, but without randomized clinical trials.
C	Made despite the absence of directly applicable clinical studies of good quality.

**Q: what are the types of clinical trials according to study design?**

A: randomized, double-blind, and placebo-controlled.

- Randomized: Each study subject is randomly assigned to receive either the study treatment or a placebo.
- Blind: The subjects involved in the study do not know which study treatment they receive. If the study is double-blind, the researchers also do not know which treatment a subject receives. This intent is to prevent researchers from treating the two groups differently. A form of double-blind study called a "double-dummy" design allows additional insurance against bias. In this kind of study, all patients are given both placebo and active doses in alternating periods.
- Placebo-controlled: The use of a placebo (fake treatment) allows the researchers to isolate the effect of the study treatment from the placebo effect.



## **Neeraj Sharma's ...Notes For Urology Practicals**

**Q: what are the phases of clinical trials?**

**A:**

Phase	Aim	Notes
Phase 0	Pharmacodynamics and pharmacokinetics in humans	Phase 0 trials are the first-in-human trials. Single subtherapeutic doses of the study drug or treatment are given to a small number of subjects (10 to 15) to gather preliminary data on the agent's pharmacodynamics (what the drug does to the body) and pharmacokinetics (what the body does to the drugs). For a test drug, the trial documents the absorption, distribution, metabolism, and removal (excretion) of the drug, and the drug's interactions within the body, to confirm that these appear to be as expected.
Phase 1	Screening for safety.	Testing within a small group of people (20–80) to evaluate safety, determine safe dosage ranges, and begin to identify side effects. A drug's side effects could be subtle or long term, or may only happen with a few of people, so phase 1 trials are not expected to identify all side effects.
Phase 2	Establishing the efficacy of the drug, usually against a placebo.	Testing with a larger group of people (100–300) to see if it is effective and to further evaluate its safety. The gradual increase in test group size allows less-common side effects to be progressively sought.
Phase 3	Final confirmation of safety and efficacy.	Testing with large groups of people (1,000–3,000) to confirm its effectiveness, monitor side effects, compare it to commonly used treatments, and collect information that will allow it to be used safely.
Phase 4	Sentry studies during sales.	Post marketing studies delineate additional information, including the treatment's risks, benefits, and optimal use. As such, they are ongoing during the drug's lifetime of active medical use. (Particularly relevant after approval under FDA Accelerated Approval Program)

Q; how will you manage biomedical waste in your hospital?

A:

## Segregation of Waste in color coded Bags

<b>YELLOW BAGS</b>	<b>RED BAGS</b>	<b>BLUE BAGS</b>	<b>BLACK CARBOY</b>
Infectious waste, bandages, gauzes, cotton or any other things in contact with body fluids, human body parts, placenta	Plastic waste such as catheters, injection syringes, tubings, i.v. bottles	All types of glass bottles and broken glass articles, outdated & discarded medicines	Needles without syringes, blades, sharps & all metal articles

## Notes

[illegible]

[illegible]





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